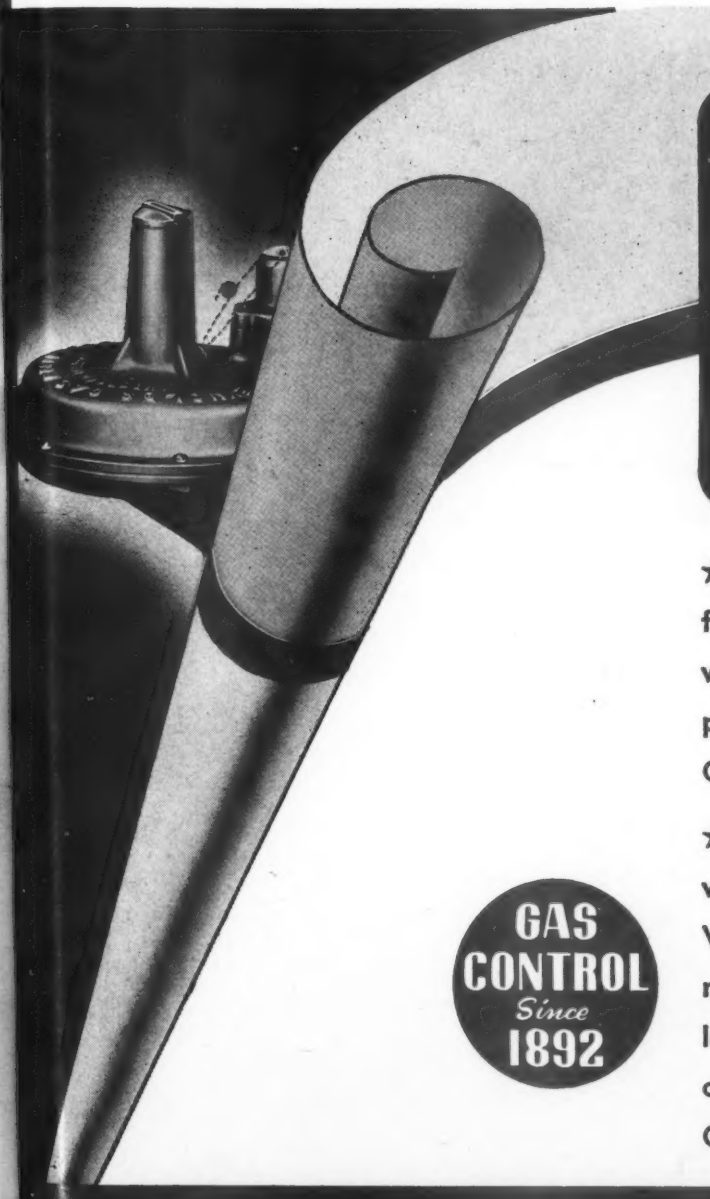
AMERICAN GAS JOURNAL



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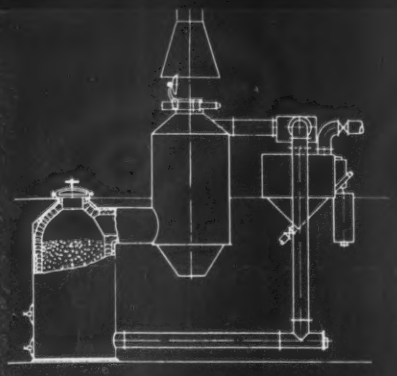
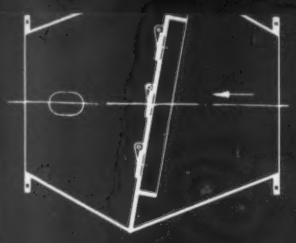
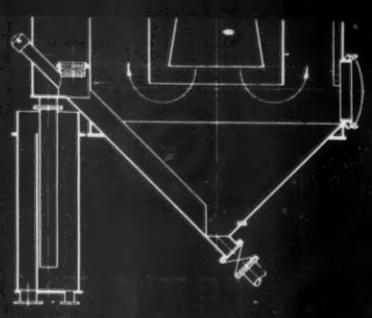


BLUE GAS MACHINE



CHECK VALVE



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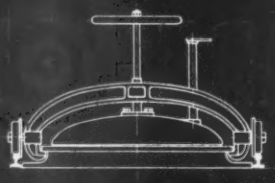
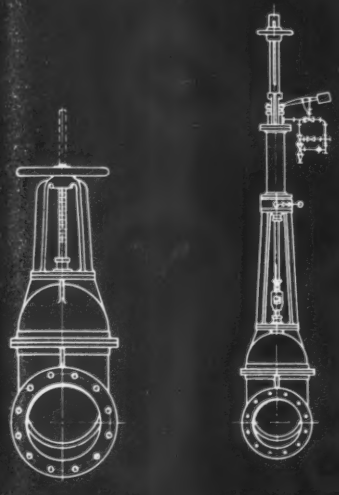
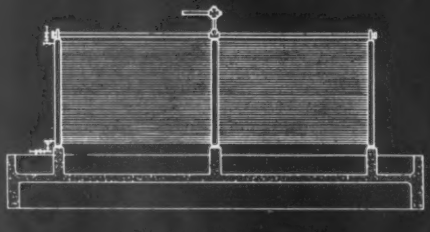


CHARGING DOOR



HAND OPER. HYDR. OPER.
GATE VALVES



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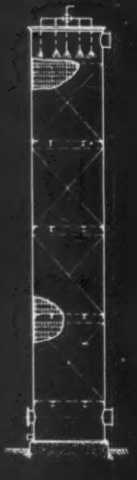

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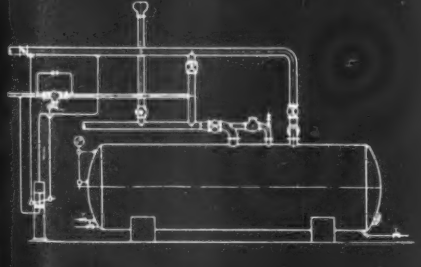
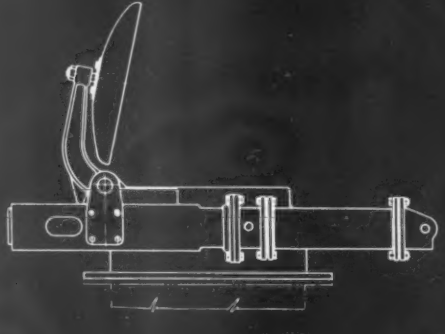
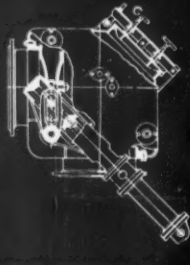


STEAM ACCUMULATOR



HYDRAULIC OPER.
STACK VALVE



HYDRAULIC OPER.
REVERSING VALVE

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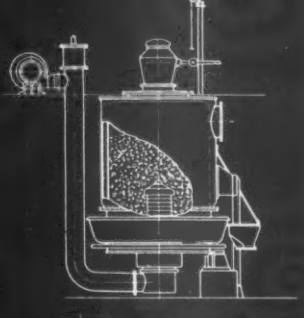

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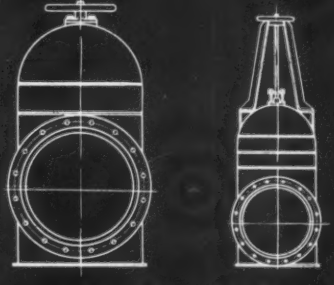
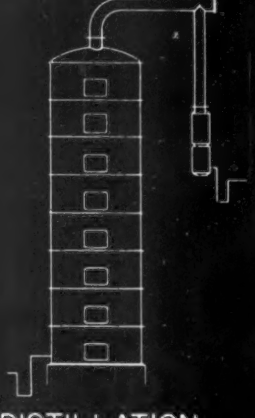


BLAST GATES



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Servel instructors have conducted service schools for 6,842 Gas Industry employees. In addition, through representation on the Domestic Mechanical Refrigeration Industry Advisory Committee in Washington, Servel executives are helping Gas Companies to obtain adequate replacement parts for wartime service needs.

Today, also, as a result of the Salesman Selection Program, developed by Servel and sponsored by the American Gas Association, Gas Companies are preparing to assure full-time post-war employment in the Gas Industry. More than that, they are making certain they will have an adequate sales force to take advantage of the many products which Gas Companies will have available after the war.

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not do the job alone. Gas Companies must be ready to merchandise these products to the public. This will call for a tremendous sales effort and will require a competent staff of trained salesmen. The Salesman Selection Program is helping to equip Sales Managers to effectively build up this force to the strength needed for this huge sales effort.

In addition, to help Gas Companies take advantage of the many sales opportunities that the post-war building boom will offer for the Servel *All-Year* Gas Air Conditioner, Servel is providing promotional material for use in holding local third-party meetings for building and housing interests. Through use of the Servel Builder Presentation, Gas Company representatives are acquainting members of this group with the sales and profit possibilities of the Servel *All-Year* Gas Air Conditioner.

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Finally, Servel is backing up this promotional program to Gas Companies with a series of aggressive advertisements to architectural, building and financial groups. Through these, Servel is helping to lay a solid foundation of market development with this important group of housing interests.

The Servel Builder Presentation is a new promotional tool for the Servel *All-Year* Gas Air Conditioner. It presents strong arguments to building and financial interests for inclusion of the *All-Year* Gas Conditioner in homes planned for post-war. Gas Companies use it as a basis for group meetings and talks with third-party interests.

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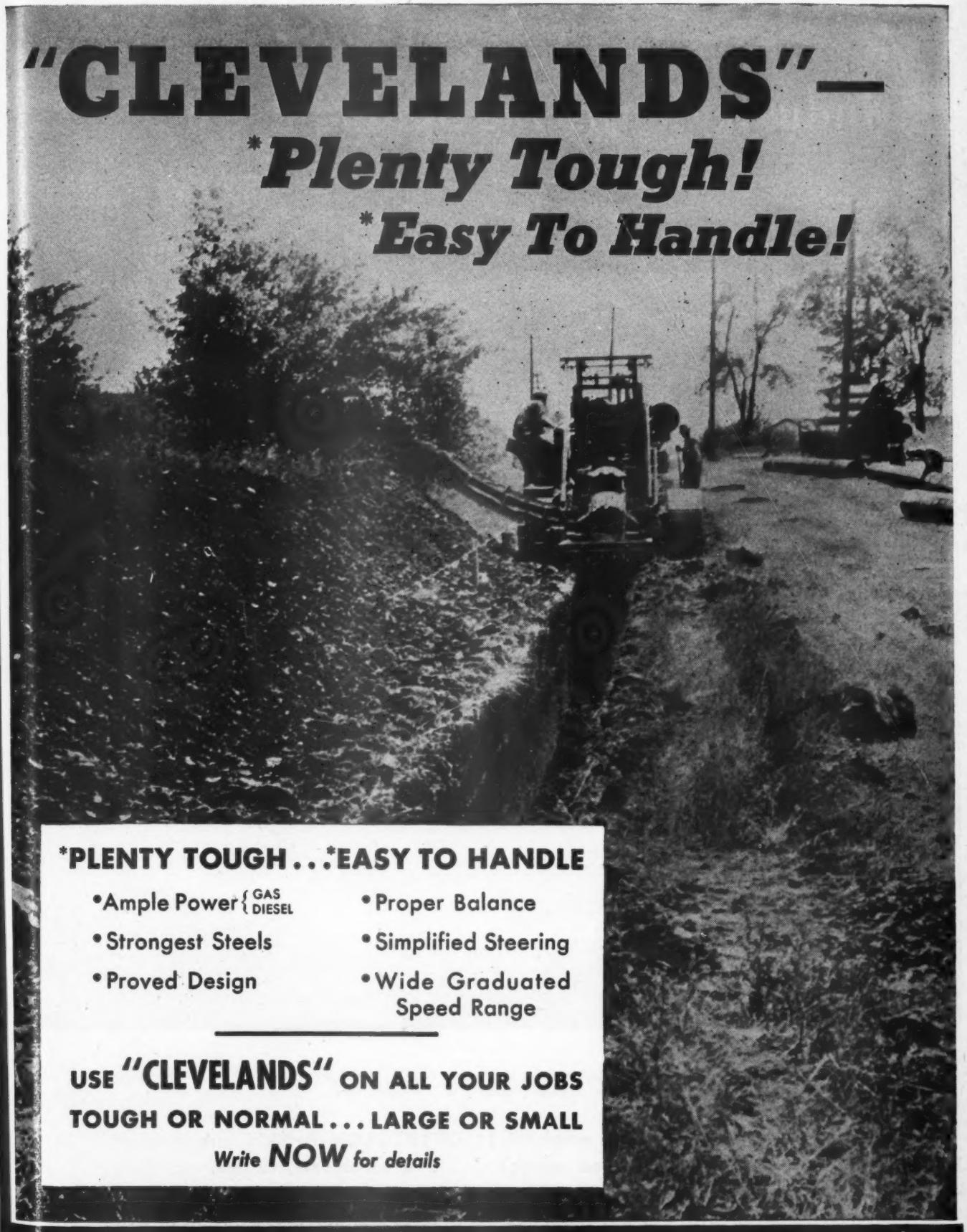

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AMERICAN
GAS JOURNAL

VOLUME 162
No. 5

Residential Gas Load Study—Single Family Dwellings

By
Ralph W. Fouse

Assistant to Rate Engineer
Consolidated Edison Company of New York, Inc.

KNOWLEDGE of the characteristics of customers' load is fundamental to the supply of gas utility service. Such characteristics include the daily load curves, quantity of use, load factors, and diversity of use between customers and between major types of appliances. These data have many uses, such as, but not limited to, engineering of additions to or changes in the distribution system, determination of meter size, guiding of promotional activities and load building, load forecasting and plant operation, and in rate studies.

Gas load studies have been made in the past, notably those that the American Gas Association included in its annual reports for 1927, 1930 and 1934. The study herein reported is based on tests made in 1941 and 1942 on 303 residential gas customers in single family dwellings in the Borough of The Bronx and a part of the Borough of Queens, New York City. It is hoped that additional data may be obtained at a later time to supplement this study.

Summary

Data on the customers tested, together with the results of these tests, are summarized in Table 1. Derived values for the separate appliances are summarized in Table 2.

Customers using gas only for cooking have low individual distribution demand load factors. However, the cooking load also has a relatively low coincidence factor (i.e. a high diversity between customers) so that the group load factor is substantially higher, especially on the 24 hour production demand basis, than the individual customer values.

The addition of refrigeration to the basic cooking load makes a marked improvement in the distribution demand load factor of the individual customer and materially improves the group load factor.

Addition of automatic storage water heating to the basic cooking load makes for even better load factors than the addition of refrigeration, except for annual group production demand load factor which was slightly lower for the group of such customers included in these tests. The few customers in the cooking and automatic water heating tests make the results of such tests somewhat inconclusive.

Space heating at zero F., the usual minimum design temperature for this locality, in combination with cooking and automatic storage water heating gives lower annual load factors than the other uses of gas in the home.

Test customers using gas only for cooking or for cooking and refrigeration made their maximum half-hour group demands around Noon on Sundays, while the week-day maximum group coincident demands occurred around 6:00 PM. The maximum half-hour group demand of the test customers using gas for cooking and automatic storage water heating occurred around 8:00 AM on week-days. The maximum half-hour group demand of the test customers using gas for space heating in combination with cooking and automatic storage water heating occurred around 7:00 AM on week-days.

A study of load characteristics of customers using gas for Cooking, Refrigeration, Automatic Storage Water Heating and Space Heating, either singly or in combination.

Test Procedure

During the period of the test, which ordinarily was of one week duration with a maximum of two weeks in several cases, the customer's regular meter was replaced by a test meter which consisted of a GG-9 graphic demand recorder, with a spring-driven clock, mounted on an appropriately sized gas meter. The graphic demand recorder recorded the 30-minute integrated demand on a seven day chart.

These test data were supplemented by information concerning the connected gas load, type of equipment, number of persons in the fam-

TABLE 1

Residential Gas Load Study - Single Family Dwellings
(Manufactured Gas of 537 Btu per Cubic Foot)

LOAD CHARACTERISTICS OF AN AVERAGE RESIDENTIAL GAS CUSTOMER IN A SINGLE FAMILY DWELLING

	Customer Data	Cooking	Cooking & Refrigeration	Cooking & Automatic Storage Water Heating	Space Heating, Cooking & Automatic Storage Water Heating (iv) Avg. Mean Daily Temp. 35.9 F	Space Heating, Cooking & Automatic Storage Water Heating (iv) Estimated for 0 F
1.	Number of test customers	148	84	6	65	
2.	Number of customer weeks	202	84	13	118	
3.	Test period	Jan.-Apr. '41 & Nov. '41-Apr. '42	Sept.-Nov. '41	Feb. '41 & Mar.-Apr. '42	Jan.-Mar. '41 & Nov. '41-Apr. '42	
4.	Number of persons per family	4.5	4.1	5.0	4.1	
5.	Number of rooms per dwelling	6.2	6.0	8.2	6.2	
6.	Connected load - cubic feet per hour	80.3	84.3	124.3	343.2 (iii)	
7.	Average mean daily temperature - F	37.5	60.6	41.8	35.9	
	Test Period Data and Factors					
8.	Weekly test period consumption - cubic feet	393.4	771.7	1,679.4	9,894.5	
9.	Maximum half-hour coincident group demand:					
	(a) Sunday - cubic feet per hour	11.7 (ii)	15.8	24.1	129.4 (36.8F)	-
	- time of occurrence (i)	12:30 P.M.	12:30 P.M.	12:00 Noon	7:00 A.M.	-
	(b) Maximum weekday - cubic feet per hour	9.7	10.3	27.8	154.3 (34.9 F)	180.0
	- day & time of occurrence (i)	6:00 P.M. (Mon.)	6:00 P.M. (Sat.)	8:00 A.M. (Wed.)	7:00 A.M. (Fri.)	-
	(c) Average weekday (Mon.-Fri.) - cubic feet per hour	9.4	9.7	24.9	140.0 (35.7 F)	-
	- time of occurrence (i)	6:00 P.M.	6:00 P.M.	8:00 A.M.	7:30 A.M.	-
10.	Maximum 24-hour group consumption - cubic feet:					
	(a) Sunday	75.1 (ii)	132.7	235.2	1,393.1 (36.8 F)	-
	(b) Maximum weekday	54.6 (Sat.)	111.7 (Sat.)	276.0 (Sat.)	1,474.7 (Fri.) (34.9 F)	2,800
	(c) Average weekday (Mon.-Fri.)	52.5	105.5	233.6	1,409.1 (35.7 F)	-
11.	Maximum half-hour non-coincident individual demand cubic feet per hour:					
	(a) Sunday	31.0	30.3	51.3	223.0	
	(b) Average weekday (Mon.-Fri.)	21.9	22.3	48.5	225.3	
	(c) Weekly test period	39.4	38.4	57.4	241.3	
12.	Maximum 24-hour individual consumption during weekly test period - cubic feet	105.5	149.9	297.1	1,730.4	
13.	Weekly coincident group Distribution Demand Load Factor Line 8 ÷ (168 x Max. value on Line 9)	20.0%	29.1%	36.0%	38.2%	32.7%
14.	Weekly coincident group Production Demand Load Factor Line 8 ÷ (7 x Max. value on Line 10)	74.8%	83.1%	86.9%	95.9%	50.5%
15.	Half-hour Distribution Demand Coincidence Factor Max. value on Line 9 ÷ Line 11 (c)	29.7%	41.1%	48.4%	63.9%	
16.	Daily (24-hour) Production Demand Coincidence Factor Max. value on Line 10 ÷ Line 12	71.2%	88.5%	92.9%	85.2%	
	Annual Data and Factors					
17.	Annual consumption - cubic feet	21,200	37,000	77,500	269,000	
18.	Annual coincident group Distribution Demand Load Factor Line 17 ÷ (8,760 x Max. value on Line 9)	20.7%	27.2%	31.8%	19.9%	17.1%
19.	Annual coincident group Production Demand Load Factor Line 17 ÷ (365 x Max. value on Line 10)	77.3%	77.6%	76.9%	50.0%	26.3%

May, 1945—American Gas Journal

TABLE 2

TABLE 2

DERIVED LOAD CHARACTERISTICS OF AVERAGE MAJOR RESIDENTIAL GAS APPLIANCES IN A SINGLE FAMILY DWELLING
Derived from Average Customer Data on Table 1

Test Period Data and Factors	Cooking	Refrigeration	Automatic Storage Water Heating	Space Heating (1v) Avg. Mean Daily Temp. 35.9 F	Space Heating (1v) Estimated for 0 F
1. Weekly test period consumption - cubic feet	393.4	378.3	1,286.0	8,781.0	
2. Maximum half-hour coincident group demand					
(a) Sunday - cubic feet per hour	11.7 (11)	4.1	13.3	123.8	-
-time of occurrence (i)	12:30 P.M.	12:30 P.M.	7:00 P.M.	7:00 A.M.	-
(b) Maximum weekday - cubic feet per hour	8.7	4.1	24.4	144.0	170.0
- day & time of occurrence (i)	6:00 P.M. (Mon.)	1:00 P.M. (Sat.)	9:00 A.M. (Sat.)	7:00 A.M. (Fri.)	-
(c) Average weekday (Monday-Friday) - cubic feet per hour	9.4	2.8	21.7	132.0	-
-time of occurrence (i)	6:00 P.M.	12:00 Noon	8:00 A.M.	7:30 A.M.	-
3. Maximum 24-hour group consumption - cubic feet					
(a) Sunday	75.1 (11)	57.6	160.1	-	-
(b) Maximum weekday	54.6 (Sat.)	57.1 (Sat.)	221.4	1,300	2,600
(c) Average weekday (Mon.-Fri.)	52.5	55.2	181.1	-	-
4. Weekly coincident group Distribution Demand Load Factor Line 1 ÷ (168 x Max. value on Line 2)	20.0%	54.9%	31.4%	36.3%	30.7%
5. Weekly coincident group Production Demand Load Factor Line 1 ÷ (7 x Max. value on Line 3)	74.8%	93.6%	85.0%	96.5%	48.2%
Annual Data and Factors					
6. Annual consumption - cubic feet	21,200	16,400	56,300	211,100 (v)	
7. Annual coincident group Distribution Demand Load Factor Line 6 ÷ (8,760 x Max. value on Line 2)	20.7%	45.7%	26.3%	16.7%	14.2%
8. Annual coincident group Production Demand Load Factor Line 6 ÷ (365 x Max. value on Line 3)	77.3%	78.0%	69.7%	44.5%	22.2%

Notes: (i) Half-hour ending
(ii) Exclusive of test results for New Year's Day (8 customers), Thanksgiving (15 customers) and Christmas (14 customers), each of which had higher values of maximum coincident half-hour demand and 24-hour consumption than shown herein. Including such holidays these values were 12.1 cubic feet per hour and 81.5 cubic feet, respectively.
(iii) The average square feet of equivalent C.I.S.R. was 232
(iv) The annual consumption data of the space heating test customers is for the 12 months ending April 30-1942, during which period the New York City Weather Bureau reported 4,777 Degree Days compared with a normal of 5,295 Degree Days.
(v) 269,000 cubic feet - 57,900 cubic feet, the latter based on 4.5 times the consumption during the meter reading periods ending in July, August and September of the 65 customers included in the space heating test.

ily, number of rooms in the dwelling, mean daily temperatures, etc. In the case of space heating customers, the kind of heating installation, thermostat settings, type of building construction and square feet of equivalent cast iron steam radiation (CISR) also were noted. Monthly billing data for twelve months or more were obtained for all test customers. Machine tabulation greatly simplified the analysis of the large volume of data.

The tests for the different types of service could not be made concurrently due to an insufficiency of test meters, with the result that there is a time differential between the various tests.

Daily Load Curves

Cooking and Cooking and Refrigeration Load Curves

Average half-hourly group load curves, expressed in cubic feet per hour, are shown on Fig. 1 for cooking and on Fig. 2 for cooking and refrigeration combined. Separate curves are shown for Sunday, for the average week-day (Monday to Friday), and for Saturday, as it was found that such grouping conformed generally with the daily use characteristics of these customers. The chief characteristic of these load curves is the mid-day peak on Sunday compared with the smaller, late afternoon, peak on the other days.

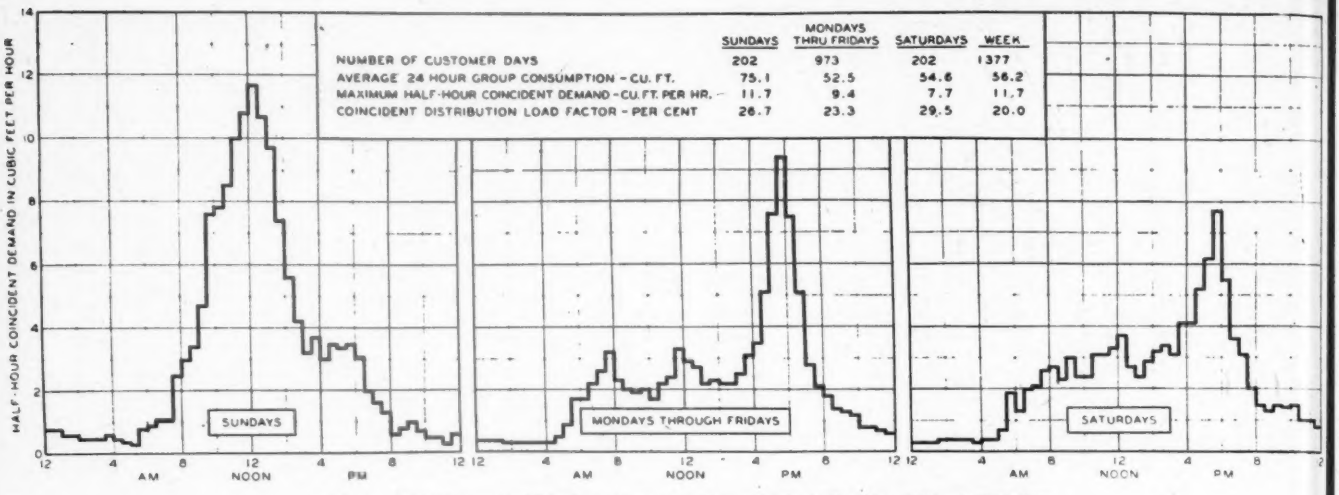
A few cooking customers were tested on New Year's Day, Thanksgiving, and Christmas. The daily load characteristics for such major holidays were generally similiar to those for Sunday but no load curves are presented due to the inadequacy of the data.

Comparison of Gas and Electric Cooking Load Curves

Fig. 3 shows the average weekday load curve for gas cooking compared with the load curve for electric cooking, which is also based on recent tests in the same locality. The load curves are similar in shape, except that throughout the greater part of the day the diversified demand of electric cooking was higher, relative to the evening peak, than for gas cooking.

Refrigeration Load Curve

Fig. 4 shows the average weekday load curve for gas refrigeration as derived by subtracting the demand for cooking only from that for cooking and refrigeration and, therefore, it may deviate somewhat from actual refrigeration use only.



	SUNDAYS	MONDAYS THRU FRIDAYS	SATURDAYS	WEEK
NUMBER OF CUSTOMER DAYS	202	973	202	1377
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT.	75.1	52.5	54.6	56.2
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR.	11.7	9.4	7.7	11.7
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT	26.7	23.3	29.5	20.0

FIG. 1 COOKING - AVERAGE HALF-HOURLY LOAD CURVES - PER CUSTOMER

The cooking and the cooking and refrigeration tests were comparable as to size of family and size of dwelling, but not as to time of year, since the cooking tests were made during the winter, when the mean daily temperature averaged 37.5 degrees, while the cooking and refrigeration tests were made in the autumn when the mean daily temperature averaged 60.6 degrees.

The data from which Fig. 4 was prepared show an erratic drop in the derived refrigeration load between 4:30 and 6:00 PM. Since refrigeration is only a small proportion of the combined cooking and refrigeration load at this time of the day, such variables as the difference in season of the year between the two tests, variations between customers, and possible differences in the time recorders on the test meters, among other factors, may have been of sufficient magnitude to affect adversely the derived values of refrigeration. It is believed that the refrigeration load curve for the remainder of the day is reasonably indicative of actual use.

Comparison of Gas and Electric Refrigeration Load Curves

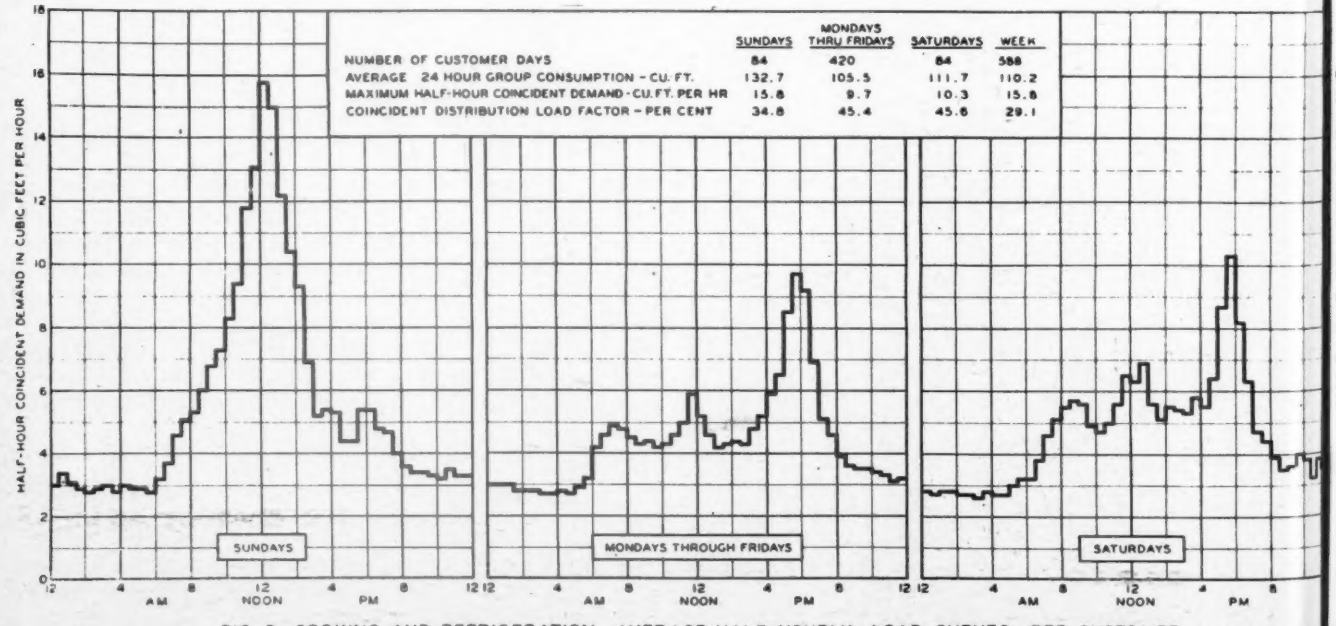
The average week-day derived load curves for gas and electric refrigeration are compared on Fig. 5. These curves are similar in shape except for the erratic behavior of the gas load curve referred to previously. The electric refrigeration load curve was derived from a much larger number of customers which has the effect of smoothing out the curve.

Cooking and Automatic Storage Water Heating Load Curve

Fig. 6 shows the average week-day group load curve for cooking and automatic storage water heating. This curve is based on only si installations averaging five person per family, compared with an aver age of slightly over four persons fo the other tests. Subject to thes limitations, Fig. 6 shows that th cooking and automatic storag water heating load on an averag week-day had its peak about 8:0 AM, with a secondary peak in th afternoon and early evening.

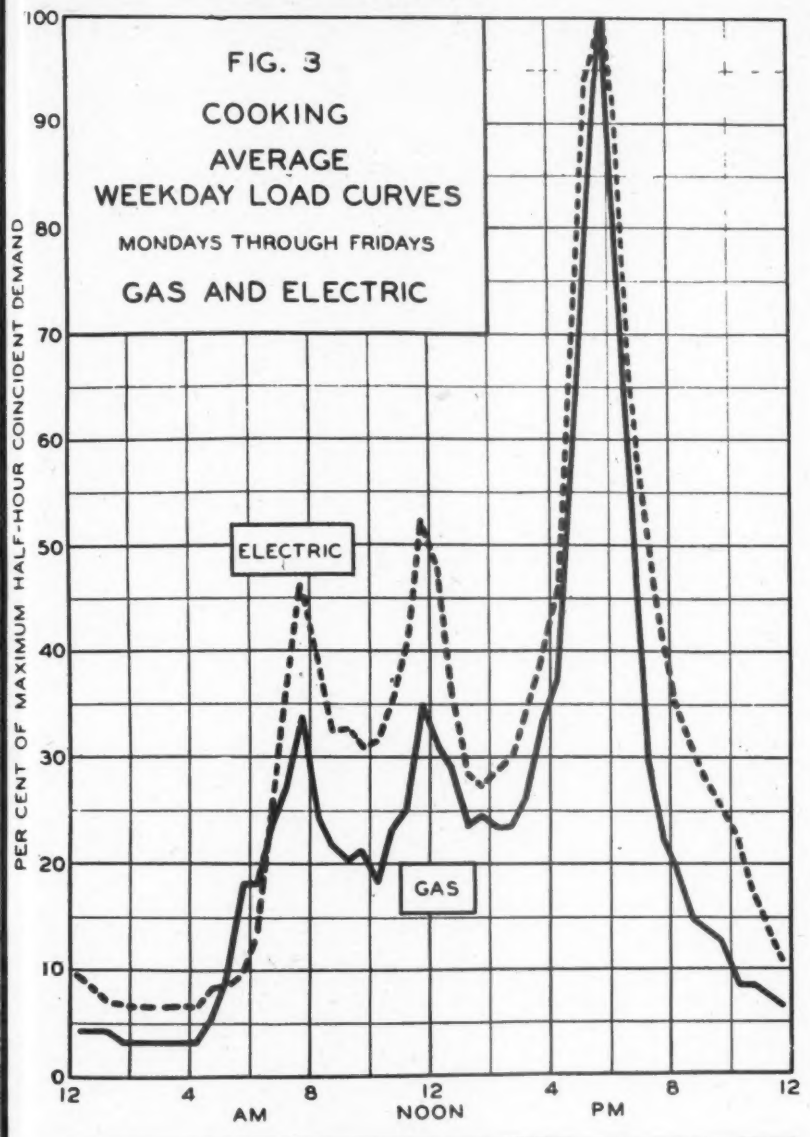
Automatic Storage Water Heating Load Curve

Fig. 7 shows the derived averag week-day load curve for automati storage water heating. While onl six installations were included i the test sample, the load curve ap proximated the pattern of hot wate draw-off on an average day as de termined by the Water Heatin Committee of the National Electri Light Association, shown in the in sert.



	SUNDAYS	MONDAYS THRU FRIDAYS	SATURDAYS	WEEK
NUMBER OF CUSTOMER DAYS	84	420	84	588
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT.	132.7	105.5	111.7	110.2
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR	15.8	9.7	10.3	15.8
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT	34.8	45.4	45.6	29.1

FIG. 2 COOKING AND REFRIGERATION - AVERAGE HALF-HOURLY LOAD CURVES - PER CUSTOMER



NUMBER OF CUSTOMER DAYS	420
AVERAGE PERSONS PER FAMILY	4.1
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT.	55.2
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR.	2.8
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT	82.1

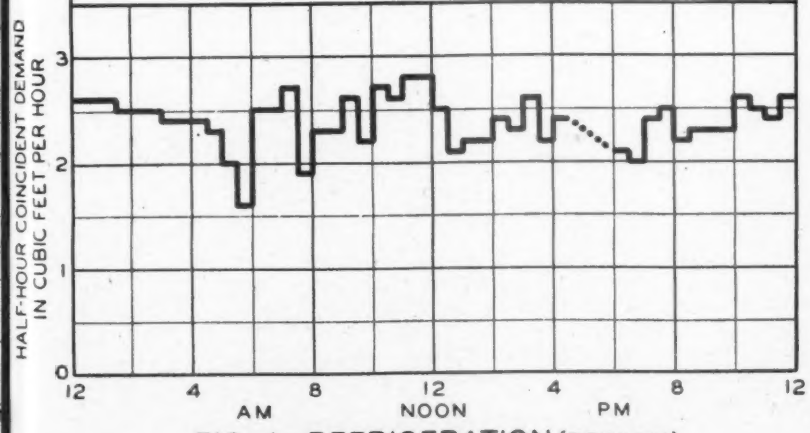


FIG. 4 REFRIGERATION (DERIVED)
AVERAGE WEEKDAY LOAD CURVE
MONDAYS THROUGH FRIDAYS

THIS CURVE WAS DERIVED BY SUBTRACTING THE DEMAND FOR COOKING ONLY FROM THAT FOR COOKING & REFRIGERATION, AND, THEREFORE, MAY DEVIATE SOMEWHAT FROM ACTUAL REFRIGERATION USE ONLY.

Fig. 7 indicates that gas was used for water heating in the home, during the average week-day, chiefly in the morning and evening and in smaller volume during the remainder of the day. Wednesday and Thursday were the week-days with the highest use, Friday was lowest while Monday, the traditional laundry day, occupied an intermediate position. Sunday was the day of least water heating gas load, with two well defined and approximately equal peaks occurring during the half-hour periods ending at Noon and at 7:00 PM, respectively.

Space Heating Load Curve

Fig. 8 shows the average daily group load curves for space heating, cooking and automatic storage water heating. The load data are arranged in three temperature groups selected to eliminate, as much as possible, the effect of extreme variations in temperature. These temperature groups were based on the mean daily temperature reported by the New York City Weather Bureau during the period of the tests, viz: 11 to 25, 26 to 39 and 40 to 70 degrees F. and averaged, respectively 19.7, 32.4 and 44.6 degrees, with an overall average of 35.9 degrees.

Supplementary data concerning the test customer's operating practices indicated that the median customer maintained a daytime thermostat setting of approximately 70 degrees F. from 6:00 AM to 10:00 PM and a night-time thermostat setting of about 55 degrees. All of the installations used clock-type thermostats.

To obtain the derived space heating load curves which are shown on Fig. 9, 75 per cent of the half-hourly demands recorded in the cooking and automatic storage water heating tests (Fig. 6) were subtracted from the demands in corresponding half-hourly periods in the space heating, cooking and automatic storage water heating tests (Fig. 8). The 75 per cent adjustment factor compensated for differences in customer size (persons per family and rooms per dwelling) in the respective tests and represented the ratio of the estimated average annual requirements for cooking and automatic water heating (57,900 cu. ft.) of the customers in the space heating tests to the average annual consumption (77,500 cu. ft.) of the customers in the cooking and automatic storage water heating tests. The estimated annual cooking and automatic

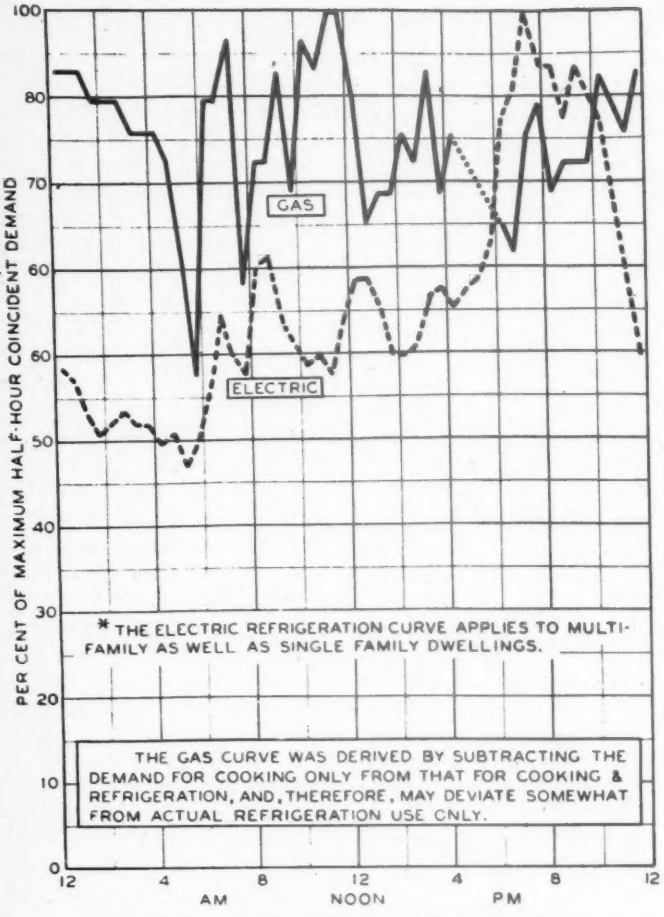

PER CENT OF MAXIMUM HALF-HOUR COINCIDENT DEMAND
GAS
ELECTRIC
* THE ELECTRIC REFRIGERATION CURVE APPLIES TO MULTI-FAMILY AS WELL AS SINGLE FAMILY DWELLINGS.
THE GAS CURVE WAS DERIVED BY SUBTRACTING THE DEMAND FOR COOKING ONLY FROM THAT FOR COOKING & REFRIGERATION, AND, THEREFORE, MAY DEVIATE SOMEWHAT FROM ACTUAL REFRIGERATION USE ONLY.
AM
NOON
PM

FIG. 5 REFRIGERATION (DERIVED)
AVERAGE WEEKDAY LOAD CURVES
MONDAYS THROUGH FRIDAYS
GAS AND ELECTRIC*

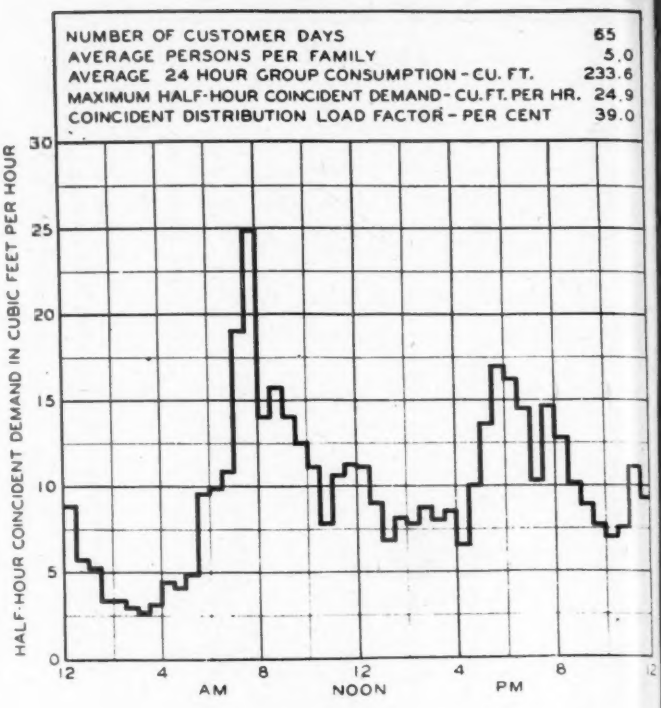

NUMBER OF CUSTOMER DAYS 65
AVERAGE PERSONS PER FAMILY 5.0
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT. 233.6
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR. 24.9
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT 39.0
HALF-HOUR COINCIDENT DEMAND IN CUBIC FEET PER HOUR
AM
NOON
PM

FIG. 6
COOKING & AUTOMATIC STORAGE WATER HEATING
AVERAGE WEEKDAY LOAD CURVE
MONDAYS THROUGH FRIDAYS

water heating requirements of the customers in the space heating test (57,900 cu. ft.) was based on the empirical formula (derived from billing data) of 4.5 times the monthly billings of these customers for the meter reading periods ending in July, August and September when little or no gas was used for space heating.

The house heating requirements, expressed in average square feet of equivalent cast iron steam radiation (CISR), applicable to the various tests reported on Figs. 8 and 9, were sufficiently uniform so as not to affect materially the comparability of the load curves for the various temperature levels.

The later peak during the colder weather, shown on Figs. 8 and 9, may be due, as others also have pointed out, to the coincidental operation of more heaters as a result of longer heater operating periods.

Load Relationships

Table 1 summarizes the data from the various tests on an average customer basis and develops various load factors and coincidence (i.e. the reciprocal of diversity) factors. The demand and consumption values reported in Table 1 were actual tests results, except for the estimate for space heating at zero degrees F, mean daily temperature, which is the usual temperature base for house heating design in this locality. Table 2 shows derived values for the separate uses of cooking, refrigeration, automatic storage water heating and space heating.

Individual Customer Load Characteristics

This study was made principally to determine the load characteristics of the average customer as a part of the group inasmuch as group coincident characteristics determine production and distribution (except services and meters) plant requirements. Service pipes and meters for single family residential customers are generally limited to certain standard sizes, which sizes are adequate over a wide range of customer load requirements, so that individual customer non-coincident load characteristics have less significance than group characteristics.

Individual non-coincident customer load characteristics (i.e., distribution or half-hour demands and production or 24-hour consumptions) are reported on Table 1, and the derived load factors are reported on Table 3. The distribution demand load factor of individual customers for the basic cooking load is relatively low, but improves with the addition of other utilization appliances.

Cooking

Cooking in the home usually makes its greatest demands on gas system facilities on Thanksgiving, Christmas and New Year's Day. Sunday is the day of group maximum demand exclusive of the foregoing major holidays. Since the available holiday test data were inconclusive because of the small size of the test sample, the group load relationships applicable to cooking, shown on Tables 1 and 2, were developed on the basis of the Sunday maximum half-hour coincident demand of 11.7 cu. ft. per hour and the average 24-hour coincident consumption of 75.1 cu. ft. However, the holiday data are summarized in Table 4 for illustrative purposes and to afford some comparison with weekly load conditions.

The average annual gas consumption of the customers included in the cooking test, based on the monthly billings, was approximately 21,200 cu. ft.

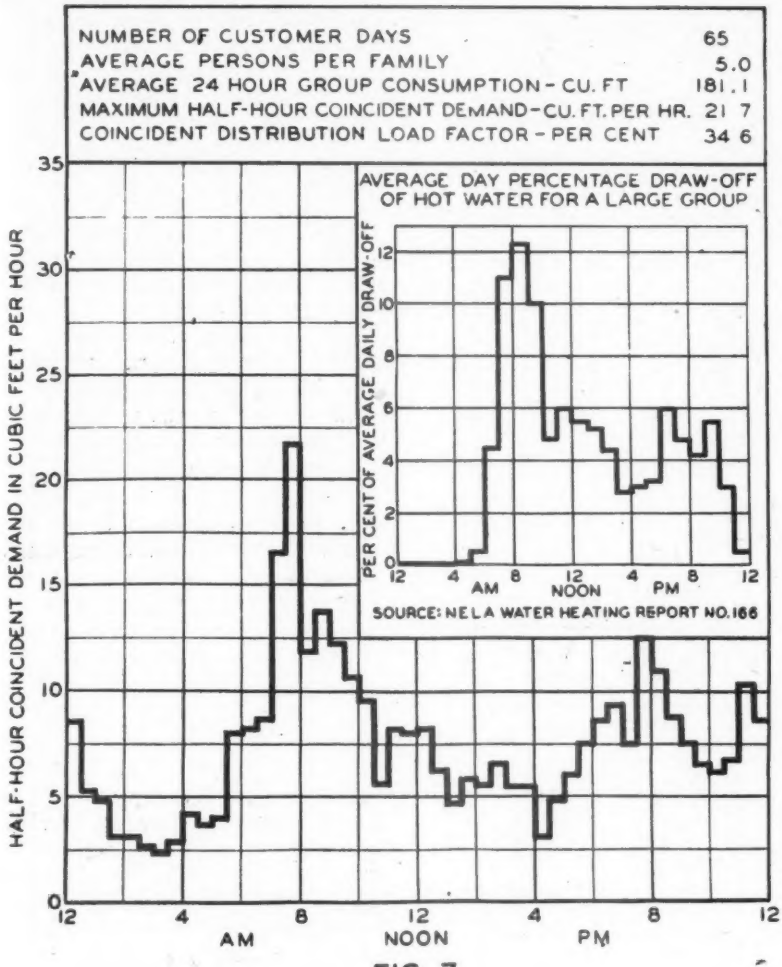

NUMBER OF CUSTOMER DAYS 65
AVERAGE PERSONS PER FAMILY 5.0
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT 181.1
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR. 21 7
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT 34 6
AVERAGE DAY PERCENTAGE DRAW-OFF OF HOT WATER FOR A LARGE GROUP
PER CENT OF AVERAGE DAILY DRAW-OFF
SOURCE: NELA WATER HEATING REPORT NO. 166
HALF-HOUR COINCIDENT DEMAND IN CUBIC FEET PER HOUR
AM
NOON
PM

FIG. 7
AUTOMATIC STORAGE WATER HEATING (DERIVED)
AVERAGE WEEKDAY LOAD CURVE
MONDAYS THROUGH FRIDAYS

TABLE 3

Individual (Non-coincident) Customer Load Factors

Based on the maximum half-hour (distribution) demands and the average 24-hour (production) consumption during the test period, relative to the weekly test period consumption, and *to the annual consumption as billed.*

	Load Factor—Per Cent			
	Weekly (Test Period)		Annual	
Use of Service For	*Distribution*	*Production*	*Distribution*	*Production*
Cooking	5.9	53.3	6.1	55.1
Cooking and Refrigeration	12.0	73.5	11.2	68.7
Cooking and Automatic Storage Water Heating	17.4	80.7	15.4	71.5
Space Heating, Cooking and Automatic Storage Water Heating at Average Test Temperature of 35.9 F	24.4	81.7	12.7	42.6

TABLE 4

Cooking Load Characteristics

Day	*Number of Customers*	*Maximum Half-Hour Demand (Cu. Ft. Per Hr.) Individual*	*Coincident (Group)*	*Average 24-Hour Coincident Consumption (Cu. Ft.)*	*Daily Coincident Distribution Load Factor Per Cent*
New Year's Day	8	38.8	22.0	117.7	22.3
Thanksgiving	15	42.6	18.3	134.0	30.5
Christmas	14	38.5	15.1	96.3	26.6
Sunday	148	31.0	11.7	75.1	26.7
Average Week-day	148	21.9	9.4	52.5	23.3
Saturday	148	22.0	7.7	54.6	29.5

Effect of Outdoor Temperature on Cooking Use

Cold weather tends to stimulate use of the cooking range in the home for the preparation of warm meals. Also, on cold days, the cooking range may be used to supplement the house heating system. To determine the effect, if any, of such practices, the cooking test data were analyzed from the standpoint of average 24-hour gas consumption and mean daily temperature with results as shown in Table 5. This table indicates that when the mean daily temperature was between 10 and 19 degrees F. the average daily cooking consumption was about 25 per cent above the test sample average. Since the customers comprising the low temperature group were typical of the entire test sample in other respects, including their daily use on days of higher temperature, it seems reasonable to assume that the unusually high daily use was due to the colder weather.

TABLE 5

Relation of Average 24-Hour Gas Consumption for Cooking to Mean Daily Temperature

Mean Daily Temp. (F)	*Average 24-Hour Consumption (Cu. Ft.)**
10 to 19	70.2
20 to 29	56.3
30 to 39	55.4
40 to 49	54.4
50 to 59	58.8
60 to 69	52.4
Combined	56.2

* Excludes major holidays

Cooking and Refrigeration

Refrigeration has a higher load factor than any other gas service rendered in the home. For cooking and refrigeration, the weekly coincident distribution demand load factor of 29.1 per cent was approximately 45 per cent greater than for cooking alone. This improvement in load factor resulting from the addition of refrigeration to the basic cooking load can usually be accomplished with little, if any, additional distribution plant. The average individual annual gas consumption of the customers in the cooking and refrigeration test, determined from monthly billings, was 37,600 cu. ft. Deducting the average annual cooking consumption of 21,200 cu. ft., left an annual refrigerator consumption of 16,400 cu. ft.

Cooking and Automatic Storage Water Heating

The weekly group distribution demand load factor for cooking and

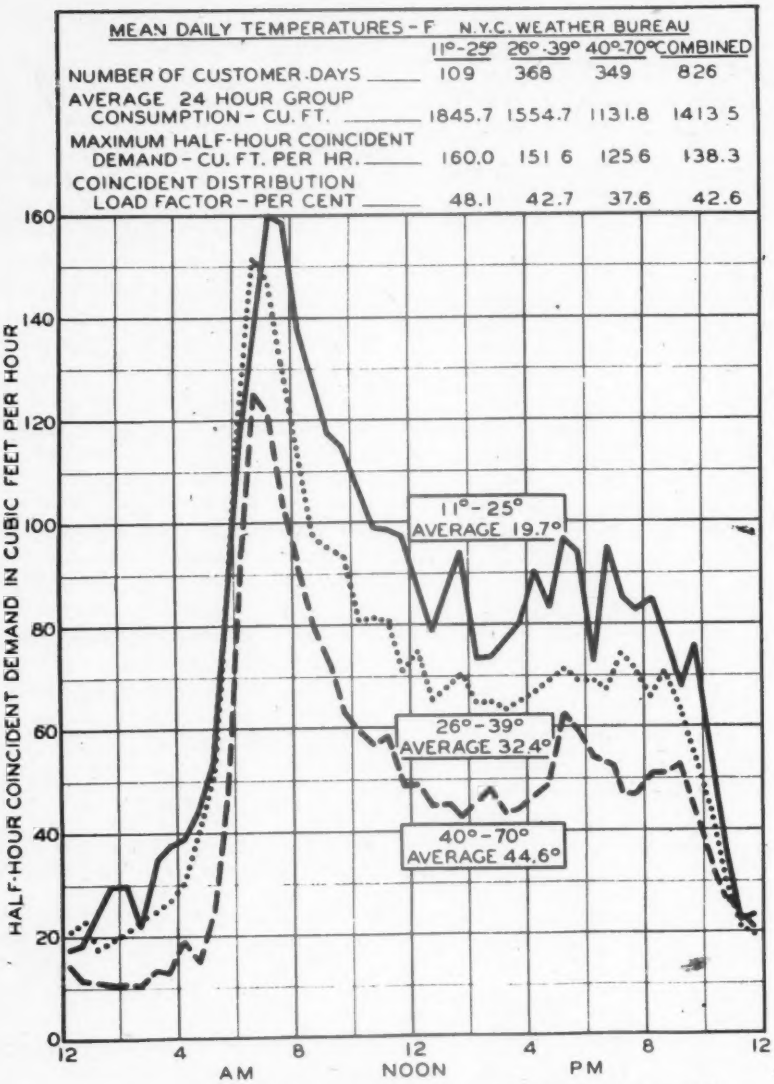

MEAN DAILY TEMPERATURES - F N.Y.C. WEATHER BUREAU
11°-25° 26°-39° 40°-70° COMBINED
NUMBER OF CUSTOMER-DAYS 109 368 349 826
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT. 1845.7 1554.7 1131.8 1413.5
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU. FT. PER HR. 160.0 151.6 125.6 138.3
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT 48.1 42.7 37.6 42.6
HALF-HOUR COINCIDENT DEMAND IN CUBIC FEET PER HOUR
0
20
40
60
80
100
120
140
160
11°-25° AVERAGE 19.7°
26°-39° AVERAGE 32.4°
40°-70° AVERAGE 44.6°
12 4 8 12 4 8 12
AM NOON PM

FIG. 8 SPACE HEATING, COOKING AND AUTOMATIC STORAGE WATER HEATING AVERAGE DAILY LOAD CURVES FOR THREE RANGES OF MEAN DAILY TEMPERATURES

automatic storage water heating, based on the six customers included in this test, was 36 per cent compared with 20 per cent for cooking alone, the improvement in load factors reflecting both the better load factor of water heating and the time diversity between the cooking and water heating loads.

The average individual gas consumption for cooking and automatic storage water heating, determined from monthly billings, was 77,500 cu. ft. Deducting the average annual cooking consumption of 21,200 cu. ft., left 56,300 cu. ft. as the average individual annual consumption for automatic storage water heating, based on the six customers tested.

Because the six customers in the cooking and automatic storage water heating test were above average in number of persons per family and rooms per dwelling compared with the other test groups, the annual cooking and water heating consumption of 77,500 cu. ft. is believed to be above average for this locality. An approximation of the cooking and automatic water heating consumption of the customers in the space heating tests, based on the empirical formula of 4.5 times the monthly billings of these customers during the meter reading periods ending in July, August and September, gave an estimated annual use of 57,900 cu. ft. Deducting the 21,200 cu. ft. of average cooking consumption from the estimated 57,900 cu. ft. for the combined services leaves 36,700 cu. ft. as the average consumption for automatic storage water heating, which is believed to be representative of average conditions in this locality.

Space Heating, Cooking and Automatic Storage Water Heating

The test results on Table 1 disclose the benefits and limitations, from a system viewpoint, of space heating by gas.

The ratio of the average connected load for cooking and for space heating, cooking and automatic water heating was approximately 1 to 4.3, i.e., 80.3 to 343.2 cu. ft. per hour. The ratio of the respective annual consumptions was 1 to 13 or 21,200 to 269,000 cubic feet. Thus the customers using gas for space heating utilized their connected load, which is indicative of service capacity requirements, about three times (13 ÷ 4.3) as much as those using gas only for cooking.

On the other hand the space heating load contributes to the establishment of a new residential class peak which may, depending on the requirements of other classes of service, necessitate additional gas production and distribution plant. It is noted that the cooking peak occurred around noon on Sundays and major holidays while the space heating peak was around 7:00 AM. That is, the maximum distribution demands of these two classes of service did not coincide as to time of day and likely would not coincide as to day of the week.

Improvement in the weekly coincident demand load factor by the successive addition, to the basic cooking load, of refrigeration and automatic storage water heating, is noted in Table 1. Space heating estimated for a mean daily temperature of zero degrees F. reverses this trend, reflecting the magnitude of the space heating load that is imposed on the system for a relatively short time on a day of extremely cold weather.

Coincidence factors and load factors, based on the weekly maximum half-hour distribution demand of the individual customers and of the group, applicable to the various tests, were as in Table 6:

Co-relation between Time of Non-Coincident Maximum Demand and Time Set on Thermostat for Changing to Day Indoor Temperature

Around 6:00 AM, according to thermostat settings, most of the test customers having space heating began increasing their indoor temperature from the night temperature setting of 55 degrees to the day temperature of 70 degrees F. Such

concerted action produced a maximum coincident demand in the early morning which was considerably in excess of the coincident demand throughout the rest of the day, as shown on Fig. 8.

However, on only 40 per cent of the test days did the individual customer's maximum demand occur at, or within one-half hour of, the time set on his thermostat for changing to the day temperature. An indication of the amount of diversity between the customers' coincident demands during the critical morning hours, from 5:30 to 8:00 AM, and the daily maximum individual (non-coincident) demands, may be obtainable from Table 7. For this purpose, the data were arranged so as to distinguish between thermostats adjusted to change to the daytime temperature earlier than 6:30 AM, and those adjusted to make such change between 6:30 and 7:30 AM. Days when the 6:00 AM temperature exceeded 39 degrees were excluded from this tabulation.

Table 7 indicates that space heating has a lower coincidence factor (i.e., greater diversity) than might be expected under the conditions where most furnaces are turned on at about the same time in the morning. Difference in the heat loss of the building, different routines of home life and the leveling effect of the half-hour period of the demand meter, may be among the reasons for this diversity.

Relationship Between Daily Consumption for Space Heating and Daily Temperature

Fig. 10 illustrates the relationship between average daily gas consumption for space heating, separately for steam, hot water and warm air heating systems, and mean daily temperature. The daily consumption for space heating was derived by deducting from the test results for space heating, cooking and automatic water heating an estimated amount of consumption for cooking and water heating. The straight lines through the plotted points on Fig. 10 indicate a direct proportionality between daily space heating consumption and mean daily temperature.

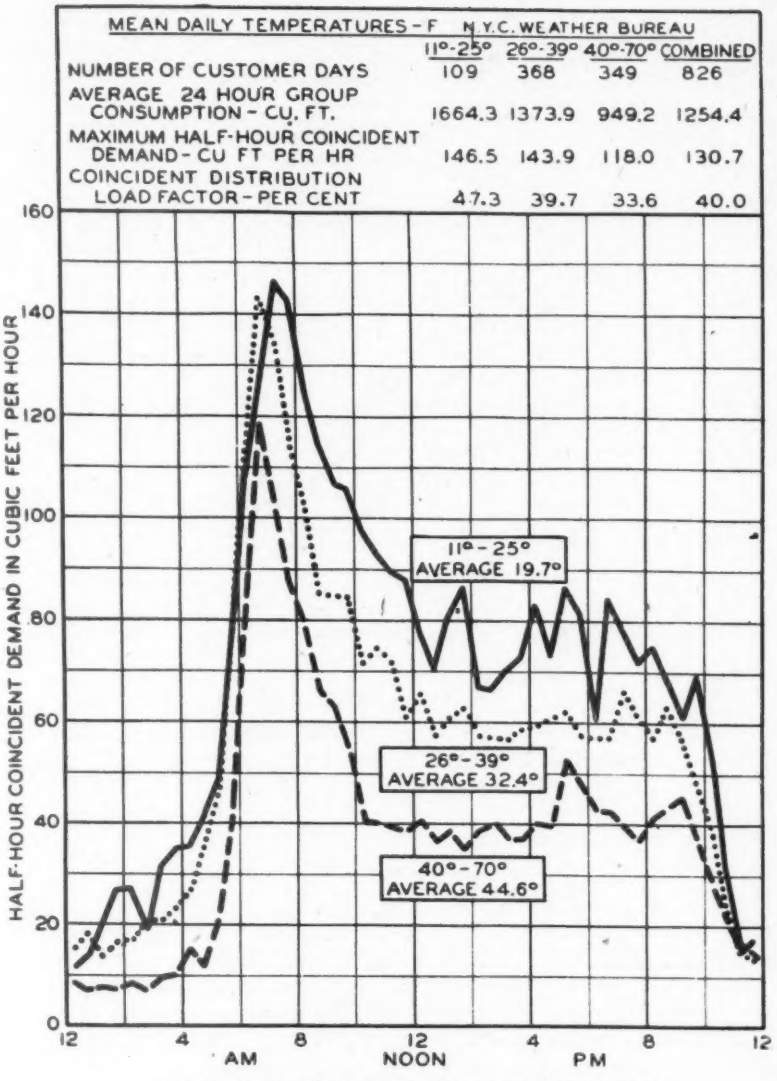

MEAN DAILY TEMPERATURES - F N.Y.C. WEATHER BUREAU
11°-25° 26°-39° 40°-70° COMBINED
NUMBER OF CUSTOMER DAYS 109 368 349 826
AVERAGE 24 HOUR GROUP CONSUMPTION - CU. FT. 1664.3 1373.9 949.2 1254.4
MAXIMUM HALF-HOUR COINCIDENT DEMAND - CU FT PER HR 146.5 143.9 118.0 130.7
COINCIDENT DISTRIBUTION LOAD FACTOR - PER CENT 47.3 39.7 33.6 40.0
HALF-HOUR COINCIDENT DEMAND IN CUBIC FEET PER HOUR
0
20
40
60
80
100
120
140
160
11°-25° AVERAGE 19.7°
26°-39° AVERAGE 32.4°
40°-70° AVERAGE 44.6°
12 4 8 12 4 8 12
AM NOON PM

FIG. 9 SPACE HEATING (DERIVED) AVERAGE DAILY LOAD CURVES FOR THREE RANGES OF MEAN DAILY TEMPERATURES

TABLE 6

Coincidence Factors and Load Factors Based on Weekly Maximum Half-Hour Demands

	Coincidence Factor (%)	*Group Distribution Load Factor (%)*
Cooking	29.7	20.0
Cooking and Refrigeration	41.1	29.1
Cooking and Automatic Storage Water Heating	48.4	36.0
Space Heating, Cooking and Automatic Storage Water Heating:		
Average Test Temp. (35.9 F)	63.9	38.2
Estimated Design Temp. (°F)	Not Calculated	32.7

TABLE 7

Coincident Half-Hour Demands of Customers with Space Heating in Per Cent of their Daily Maximum Non-Coincident Demands

	Thermostat day blade set		
Time—AM	*Before 6:30 AM*	*Between 6:30 and 7:30 AM*	*Combined*
5:30-6:00	38.6%	25.0%	34.0%
6:00-6:30	63.7%	30.2%	51.1%
6:30-7:00	72.7%	50.0%	64.0%
7:00-7:30	71.5%	59.7%	66.8%
7:30-8:00	61.4%	67.0%	63.1%

Relationship Between Annual Gas Consumption for Cooking and for Cooking and Refrigeration and Number of Persons per Family

The results of an analysis of annual consumption for cooking and for cooking and refrigeration in re-

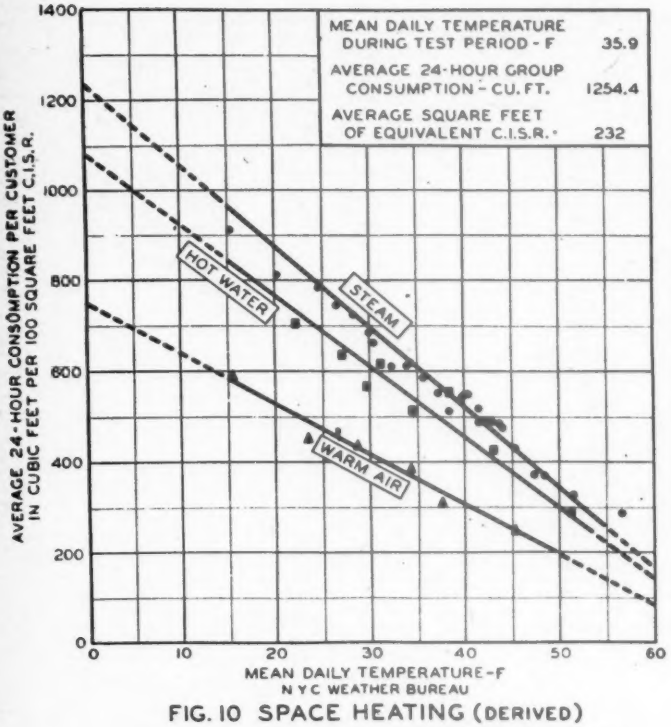

MEAN DAILY TEMPERATURE DURING TEST PERIOD - F 35.9
AVERAGE 24-HOUR GROUP CONSUMPTION - CU. FT. 1254.4
AVERAGE SQUARE FEET OF EQUIVALENT C.I.S.R. 232
HOT WATER
STEAM
WARM AIR
AVERAGE 24-HOUR CONSUMPTION PER CUSTOMER IN CUBIC FEET PER 100 SQUARE FEET C.I.S.R.
MEAN DAILY TEMPERATURE-F N.Y.C. WEATHER BUREAU

FIG. 10 SPACE HEATING (DERIVED) AVERAGE 24-HOUR CONSUMPTION AND MEAN DAILY TEMPERATURES
BY TYPE OF HEATING INSTALLATION
EACH POINT REPRESENTS 20 CUSTOMER DAYS

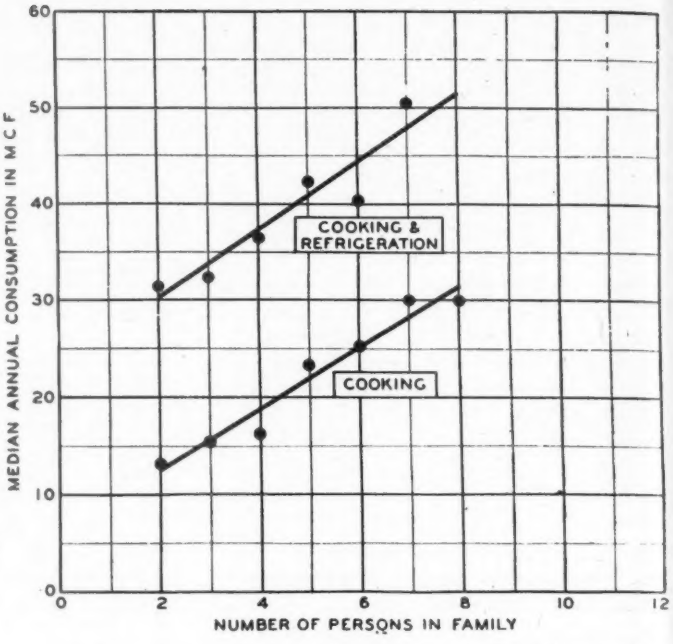


FIG. 11 COOKING, COOKING & REFRIGERATION, ANNUAL CONSUMPTION AND NUMBER OF PERSONS PER FAMILY

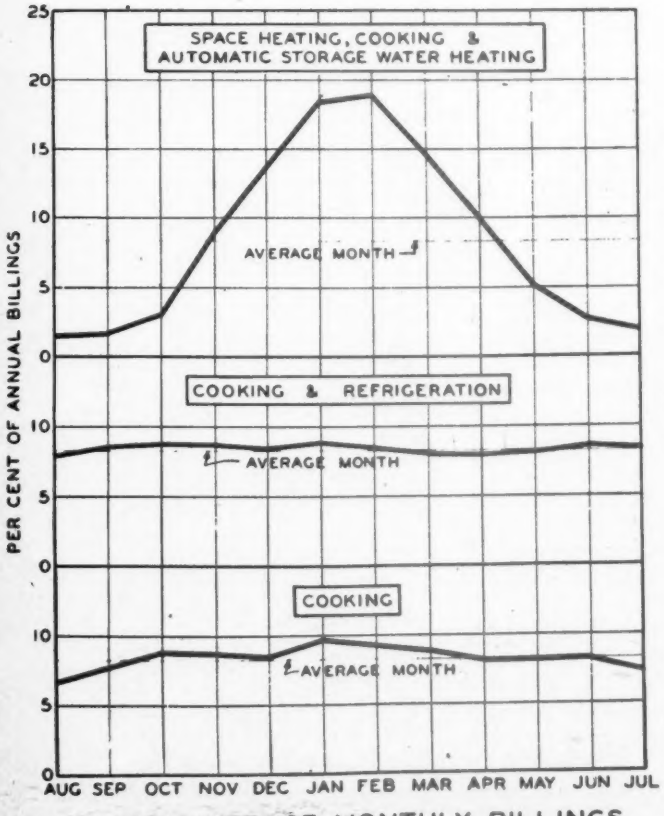

SPACE HEATING, COOKING & AUTOMATIC STORAGE WATER HEATING
AVERAGE MONTH
COOKING & REFRIGERATION
AVERAGE MONTH
COOKING
AVERAGE MONTH
PER CENT OF ANNUAL BILLINGS
AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL

FIG. 12 AVERAGE MONTHLY BILLINGS IN PER CENT OF ANNUAL

THE MONTH SHOWN IS THAT IN WHICH THE METER WAS READ. BECAUSE OF CYCLED INDEXING A PART OF THE CONSUMPTION SHOWN FOR ANY MONTH OCCURRED IN THE PRECEDING MONTH.

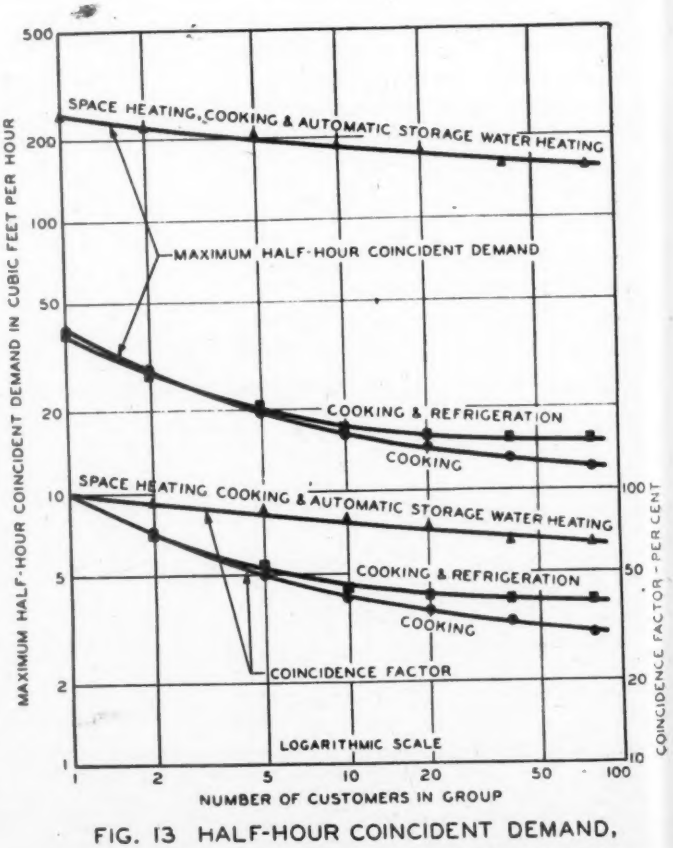

SPACE HEATING, COOKING & AUTOMATIC STORAGE WATER HEATING
MAXIMUM HALF-HOUR COINCIDENT DEMAND
COOKING & REFRIGERATION
COOKING
SPACE HEATING COOKING & AUTOMATIC STORAGE WATER HEATING
COOKING & REFRIGERATION
COOKING
COINCIDENCE FACTOR
LOGARITHMIC SCALE
MAXIMUM HALF-HOUR COINCIDENT DEMAND IN CUBIC FEET PER HOUR
COINCIDENCE FACTOR - PER CENT
NUMBER OF CUSTOMERS IN GROUP

FIG. 13 HALF-HOUR COINCIDENT DEMAND, COINCIDENCE FACTOR, AND SIZE OF GROUP
BASED ON WEEKLY TEST PERIOD

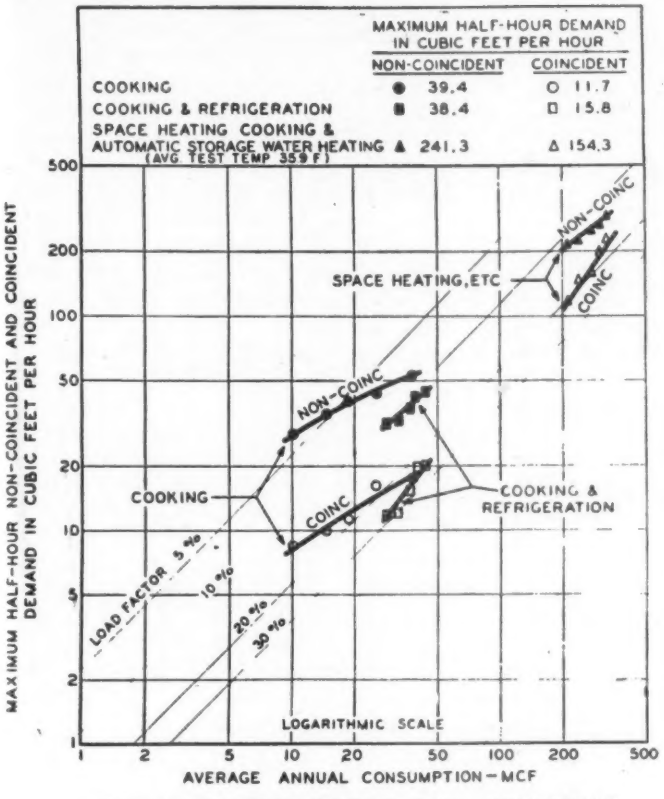


FIG 14 NON-COINCIDENT AND COINCIDENT MAXIMUM HALF-HOUR DEMAND, ANNUAL LOAD FACTOR, AND ANNUAL CONSUMPTION

DEMANDS BASED ON WEEKLY TEST PERIOD
EACH POINT REPRESENTS A GROUP OF 30 CUSTOMERS

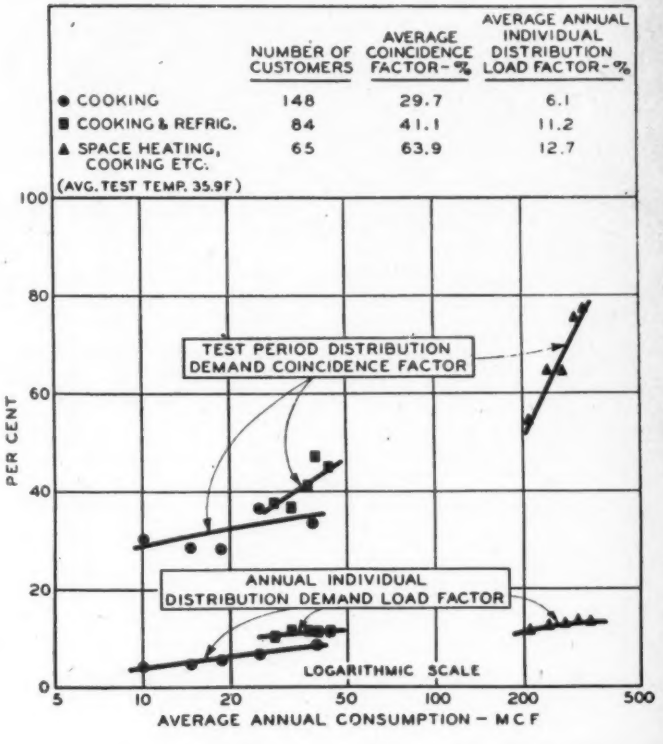

NUMBER OF CUSTOMERS
AVERAGE COINCIDENCE FACTOR - %
AVERAGE ANNUAL INDIVIDUAL DISTRIBUTION LOAD FACTOR - %
● COOKING 148 29.7 6.1
■ COOKING & REFRIG. 84 41.1 11.2
▲ SPACE HEATING, COOKING ETC. 65 63.9 12.7
(AVG. TEST TEMP. 35.9 F)
PER CENT
TEST PERIOD DISTRIBUTION DEMAND COINCIDENCE FACTOR
ANNUAL INDIVIDUAL DISTRIBUTION DEMAND LOAD FACTOR
LOGARITHMIC SCALE
AVERAGE ANNUAL CONSUMPTION - MCF

FIG. 15 COINCIDENCE FACTOR, ANNUAL LOAD FACTOR, AND ANNUAL CONSUMPTION

EACH POINT REPRESENTS A GROUP OF 30 CUSTOMERS

lation to the number of persons per family are reported in Fig. 11. The median value of annual consumption was used, in preference to the arithmetic average, so as not to give undue weight to extremes.

Variation in Monthly Billing—Seasonal Effect

Fig. 12 illustrates the seasonal effect on gas consumption for cooking, for cooking and refrigeration and for space heating, cooking and automatic storage water heating. The individual customer's monthly billings were expressed as a per cent of his annual total to eliminate the effect of size. No adjustment was made to put the meter reading cycle on a calendar month basis, nor was any adjustment made for the effect of averaged bills, which represented approximately 4 per cent of the total bills in each test sample.

Maximum Coincident Demand Compared With Number of Customers in Group

The coincident maximum half-hour distribution demand of a group of customers is less than the total of the maximum demands of the individual customers in the group because of the diversity in time of occurrence of the individual customer's demands. Up to a certain point, the average coincident maximum demand becomes progressively smaller as the number of customers in the group is increased. Beyond that point further increases in the size of the group produce relatively little, if any, change in the value of average group coincident maximum demand.

Fig. 13 shows that the point of relative stability in the weekly coincident maximum half-hour distribution demand was reached, particularly as to cooking and as to space heating, cooking and automatic water heating, when the group comprised between 30 and 40 customers. A somewhat smaller size group was sufficient to produce substantial stability in this respect in the case of cooking and refrigeration.

The coincidence factors (i.e., coincident maximum half-hour distribution demands expressed as a per cent of their individual maximum half-hour demands) based on the weekly maximum half-hour distribution demands, are shown at the bottom of Fig. 13, for various sizes of customer groups. These coincidence factors are summarized in Table 8, separately for cooking, for cooking and refrigeration, and for space heating, cooking and automatic storage water heating.

Maximum Non-Coincident and Coincident Demands Compared With Annual Use

Fig. 14 shows the effect of average annual consumption, as a measure of customer size, on the non-coincident (individual) and the weekly coincident (group) maxi-

TABLE 8

Per Cent Coincidence Factors for Various Sizes of Customer Groups

Based on Weekly Maximum Distribution Demands (Fig. 13)

	Number of Customers in Group					
	1	*10*	*20*	*30*	*40*	*80*
Cooking	100.0	40.6	36.5	34.0	33.2	30.7
Cooking and Refrigeration	100.0	44.5	41.7	40.5	40.1	39.8
Space Heating, Cooking and Automatic Storage Water Heating at Average Test Temperature of 35.9 F	100.0	77.7	72.8	69.0	65.4	64.2

mum half-hour distribution demands, and on the annual distribution load factor, for cooking, for cooking and refrigeration, and for space heating, cooking and automatic storage water heating at the average test temperature.

Within the annual consumption range shown on Fig. 14, both the non-coincident and the coincident weekly distribution demand load factors for cooking improved as the customer's annual consumption increased. For cooking and refrigeration and for space heating, cooking and automatic water heating, the distribution demand load factors were somewhat higher than those for cooking only, but, as annual consumption increased, the individual customer's load factors rose only slightly while the coincident load factors actually decreased. The annual non-coincident and coincident distribution demand load factors for customers with space heating will be lower than those shown in Fig. 14, if based on the demands estimated to be incurred at zero degrees temperature.

Relationship Between Coincidence Factor, Load Factor and Annual Consumption

Fig. 15 shows the relation of the distribution demand coincidence factor during the test period, and of the individual customer's annual distribution demand load factor, to the average annual consumption. With respect to each of the classes of customers included in these tests, both the test period distribution demand coincidence factor and the individual annual distribution demand load factor increased with increase in annual consumption. The increase in test period distribution demand coincidence factor with increase in annual consumption was greater for the space heating customers, at the average test temperature, than for the cooking and refrigeration customers, which in turn showed a greater increase in distribution demand coincidence factor than for the customers who use gas for cooking only. The distribution demand coincidence factor for the customers with space heating may be expected to be even greater than shown on Fig. 15, if based on the demands estimated to be incurred at zero degrees temperature.

The individual annual distribution demand load factors are relatively low through the range of annual consumption shown on Fig. 15. It is noted that load factors for cooking and refrigeration are higher than those for cooking only, for equal annual consumptions. The load factors for the customers with space heating are for the average test temperature of 35.9 degrees and are greater than would be expected if based upon the demands estimated to be incurred at zero degrees temperature.

1945-46 New England Gas Association Officers

The officers of the New England Gas Association were elected by proxy on March 28th, as the regular annual meeting had been cancelled.

The new officers are:

President, D. S. Reynolds, vice president and chief engineer, Boston Consolidated Gas Company.

1st Vice President, L. E. Knowlton, engineer, Providence Gas Company.

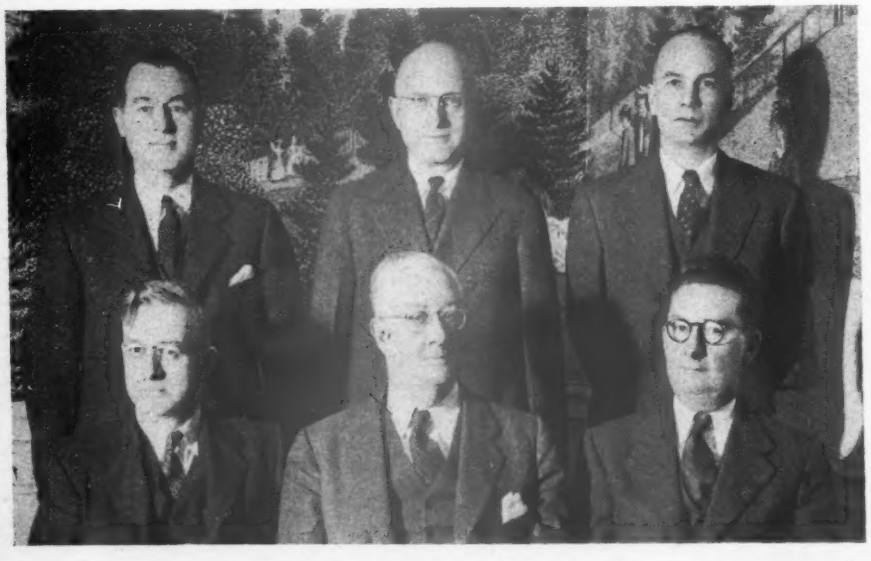
2nd Vice President, J. A. Cook, general manager, Lynn Gas and Electric Company.

Treasurer, E. H. Eacker, vice president, Boston Consolidated Gas Company.

Executive Secretary and Clerk, Clark Belden, Boston.

17 Elective Directors

F. D. Campbell, New England Gas & Electric Assn., Cambridge; E. M. Farnsworth, Boston Consolidated Gas Company; W. G. Jennings, Minneapolis - Honeywell Regulator Company, Boston; A. V. S. Lindsley, The Connecticut Light & Power Company, Waterbury; E. C. McGraw, Stone & Webster Service Corp., Boston; J. H. McPherson, J. B. Clow & Sons, Boston; I. L. Moore, New England Power Assn., Boston; A. G. Neal, Fitchburg Gas & Elec. Light Company; E. F. Putnam, The Greenwich Gas Company; R. E. Ramsay, New Haven Gas Light Company; J. J. Scott, Lewiston Gas Light Company; E. G. Twohey, Worcester County Electric Company; J. L. Underhill, North Attleboro Gas Company; C. P. Warner, Concord Gas Company; J. A. Weiser, The Newport Gas Light Company; John West, Worcester County Electric Company; C. G. Young, Springfield Gas Light Company.



1945-46 NEGA OFFICERS

FRONT ROW (l. to r.) L. E. Knowlton, Providence Gas Co. (1st vice president); D. S. Reynolds, Boston Consolidated Gas Co. (incoming president); H. M. Henry, Negea Service Corp., Cambridge (retiring president).
REAR ROW (l. to r.) E. H. Eacker, Boston Consolidated Gas Co. (treasurer); J. A. Cook, Lynn Gas & Electric Co. (2nd vice president); Clark Belden, Boston (executive secretary, clerk).

2 Most Recent Past Presidents

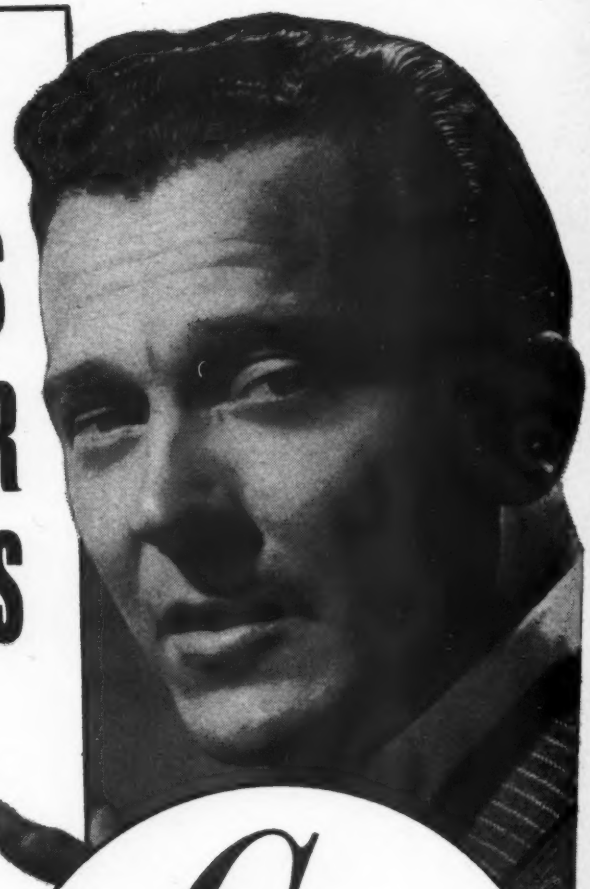
H. M. Henry, Negea Service Corporation, Cambridge; N. B. Bertolette, The Hartford Gas Company.

5 Division Chairmen

H. A. Martinson, Boston Consolidated Gas Company — Accounting Division; R. C. LeMay, The Connecticut Lt. & Pr. Co., Waterbury—Industrial Division; A. McW. Wolfe, Nathaniel Tufts Meter Works, Boston—Manufacturers Division; G. P. Langton, Arlington Gas Light Company — Operating Division; R. E. Finnin, Boston Consolidated Gas Company—Sales Division.

THESE 20 MANUFACTURERS ARE HELPING YOU TO

SELL YOUR DEALERS ON SELLING HIGHER GRADE GAS RANGES



A-B STOVES, INC.
AMERICAN STOVE CO.
CALORIC GAS STOVE WORKS
CRIBBEN & SEXTON CO.
DETROIT-MICHIGAN STOVE CO.
THE ESTATE STOVE CO.
GLENWOOD RANGE CO.
JAMES GRAHAM MFG. CO.
GRAND HOME APPLIANCE CO.
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A. J. LINDEMANN & HOVERSON CO.
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In Canada: CLARE BROS. & CO., LTD.
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CP TRADE MARK
ASSOCIATION OF GAS APPLIANCE & EQUIPMENT MANUFACTURERS

TIE-IN TO THIS BIG NATIONAL INDUSTRY-WIDE PROGRAM NOW

IN A comprehensive list of eighteen trade papers, 'CP' manufacturers are telling the story of 'CP' and gas for cooking, to every important electrical and gas appliance dealer, department store, furniture store, hardware store, architect, builder, and home economist.

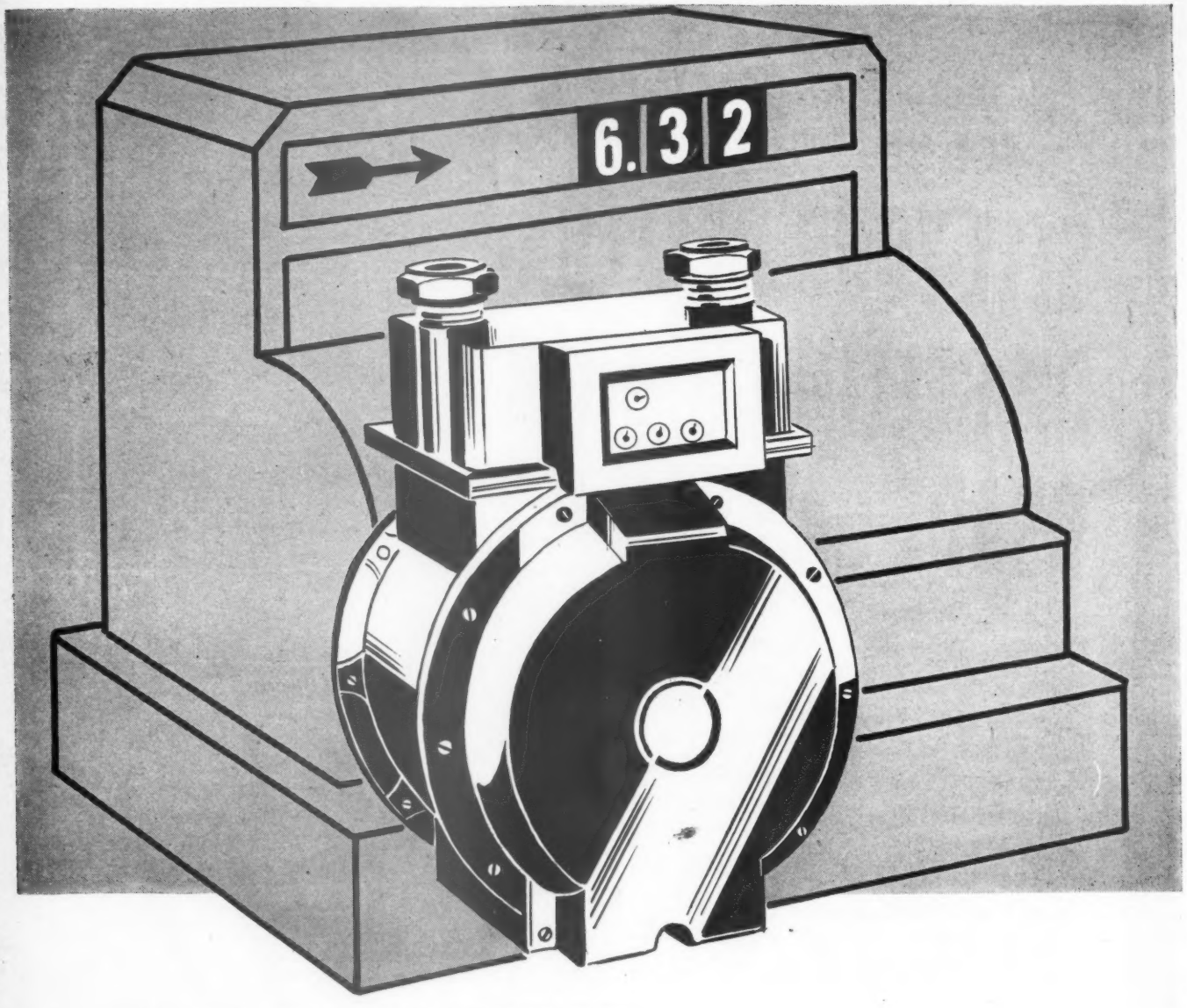
In addition, these 20 manufacturers are featuring 'CP' in their own national advertising — reaching millions of homemakers each month.

Inquiries are pouring in for the 'CP' cook book and for the 'CP' dealer kit, ready soon.

Ready for you *now*, for circularizing your dealers, are proofs of these effective 'CP' advertisements. Ready as soon as war conditions permit, will be a complete comprehensive program for selling your customers and your dealers. They are waiting to know what you will have for them after the war. It's time to tell them now.

For samples of 'CP' advertising, to use in multiplying the effectiveness of this promotion among your dealers, *write today to Association of Gas Appliance and Equipment Manufacturers, 60 East 42nd Street, New York 17, N. Y.*

GAS—THE WONDER FLAME FOR MATCH-LESS COOKING



THE GAS METER . . .
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Because **VULCANS** are manufactured, rather than natural products, their physical and chemical composition can be controlled for uniformity and precision.

The big advantage of **VULCAN** *molded* diaphragms is that they are molded to contour—not stretched or forced into shape. They have no weak spots, either natural or caused by stretching. They do not expand or shrink, crack or peel . . . need no oiling for flexibility. Thus they do not dry out and become hard or brittle.

In **VULCAN** Loops, the seams are vulcanized—not stitched. This eliminates one common cause of leakage.

Keep your eye on **VULCAN** for important new advancements in meter and regulator diaphragms. Important NEW things are coming.

Diaphragms For Manufactured Natural L-P Gases

VULCAN

PROOFING COMPANY

FIRST AVENUE AND FIFTY-EIGHTH STREET, BROOKLYN 20, N. Y.

Production Cost of Excess Gas Made for House Heating Above Present Saturation

By
John A. Weiser
President and General Manager
Newport Gas Light Co., Newport, R. I.

WHEN the Company Managers Conference Committee requested me to make a study of the capital expenditures necessary and the "production cost per mcf made" for gas to be sold for house heating purposes on the basis of several high saturation points, I thought the task would be rather dry and uninteresting, and that, when I finished, I would arrive at costs and conclusions that would be obvious to any gas man without taking the time to make the study.

I was very much surprised to learn what would happen to our plant as the study progressed, and I was utterly amazed at the results shown by the study for a small gas plant and I hope that you will be as impressed by the figures developed in the study as I am.

At the outset I want to specifically caution you to bear in mind that the data submitted in this report do not include any costs or capital expenditures made necessary in the distribution system of a gas company in order to deliver the amount of gas it has been found necessary to make to serve the various saturation points of house heating customers. This should be the basis of an additional study.

In thinking the problem through for the small gas company, it was found that if more than 10% of the domestic customers of a small company were taken on as house heating customers, an entirely new production plant would have to be designed and built. This is particularly true of the Newport Company. Therefore, we set up our data on the basis of a 2% saturation of domestic house heating customers, 5% saturation of domestic house heating customers and 10% saturation of domestic house heating customers.

Our present saturation is 1.14% and this coupled with the existing demand for gas in Newport has caused our plant to be loaded to its present capacity to make and deliver

John A. Weiser

all the gas our consumers require at this time with peak days of 1700 mcf on the coldest days of the winter. Therefore, our study is based on the excess amount of house heating gas we will have to make to serve 2%, 5% and 10% saturation of house heating customers over and above the amount made for this purpose at the present time.

As in most studies of this kind several assumptions have been made as follows:

(a) that the existing production facilities at the plant of the Newport Gas Light Company are used to the fullest extent under present conditions, serving 86 house heating customers, 7,481 domestic customers, 528 commercial customers, 641 gas street lights and 3 housing projects totaling 1400 units.

(b) that the additional house heating load over and above the present saturation of 1.14% will require new production facilities to be used only in producing the additional house heating load.

(c) that these new faciilties will be water gas sets with the necessary auxiliary equipment such as blowers, additional condensing, purification, storage and steam plant facilities.

(d) the size of the new sets to be installed will be 8′ sets with automatic control, manually charged and manually clinkered.

(e) present day costs of labor, all fuel, etc., are used in our calculations.

(f) no manufacturers of equipment were contacted so that exact quotations could not be had on the new equipment that it was found necessary to install for the 2% saturation point and the 10% saturation point; we used the base figures available from our knowledge of the equipment or from quotations received on similar equipment within the recent past.

The costs as determined in this report fall into two groups:

TABLE I

NEWPORT HOUSE HEATING ESTIMATE

		Present			
1.	Saturation	1.14%	2%	5%	10%
2.	No. dom. h. h. installations	86	150	375	750
3.	Av. annual cons/customer	290	270	260	250
4.	Total annual sales mcf	24800	40500	98000	187000
5.	Total gas made (6.7% unacct) mcf	26900	43500	103000	196000
6.	Max. day mcf	269	435	1030	1960
7.	Use/cust-max day mcf	3.1	2.9	2.74	2.61
8.	Max. hr. demand mcf	15.8	25.5	61.	116.0
9.	Max. hr. demand/customer	.182	.17	.161	.153

TABLE II - 2% SATURATION DATA

	Peak	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Per Cent of total Sales		1.6	5.9	11.6	17.0	19.3	17.2	14.3	9.	4.1	100
Gas Sales mcf	405	650	2380	4700	6900	7800	6960	5800	3600	1710	40500
Less present heating gas sold mcf	248	395	1460	2860	4200	4800	4250	3560	2230	1045	24800
Additional gas to be sold for 2% saturation mcf	157	255	920	1840	2700	3000	2710	2240	1370	665	15700
Gas made (6.7% unacct) mcf	435	700	2560	5060	7400	8400	7500	6200	3920	1760	43500
Less present heating gas made mcf	269	425	1580	3120	4570	5230	4650	3850	2400	1075	26900
Additional gas to be made for 2% saturation mcf	166	275	580	1940	2830	3170	2850	2350	1520	685	16600
Aver. net daily hours of operation @ 95 mcf per hr (8' set) mcf	1.8	.09	.343	.68	1.	1.11	1.	.82	.53	.24	
No. of 8 hr shifts charged to water gas operation	1	1	1	1	1	1	1	1	1	1	
No. of water gas sets in operation	2	1	1	2	2	2	2	2	2	1	
Plus spare sets	1	1	1	1	1	1	1	1	1	1	
Total No. water gas sets	3	2	2	3	3	3	3	3	3	2	
Aver. No. water gas makers on duty 1 day	1	0	0	1 man 4 hr/wk	1 man 7 hr/wk	1 man 8 hr/wk	1 man 7 hr/wk	1 man 7 hr/wk	0	0	
Total hours water gas makers				20	30	35	30	30			145
Total hours water gas makers helpers											145

3 water gas sets necessary

	Annual Hours Total xx	Charged to W.G.	Charged to maint.
Organization should include 1 W. G. Maker	2500	145	2355
" " " 1 " " Helper	2500	145	2355
	5000	290	4710

We did not add one additional shift to break the above shifts because we would have such labor available.

xx based on 48 hr. work week

TABLE III - 5% SATURATION DATA

	Peak Day	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Per Cent of Total Sales		1.6	5.9	11.6	17.0	19.3	17.2	14.3	9.	4.1	100
Gas Sales mcf	980	1570	5800	11300	16600	18800	16800	14000	8800	4330	98000
Less present heating gas sold mcf	248	395	1460	2860	4200	4800	4250	3560	2230	1045	24800
Additional gas to be sold for 5% saturation	732	1175	4340	8440	12400	14000	12550	10440	6570	3285	73200
Gas made mcf (6.7% unacctd)mcf	1030	1640	6100	12000	17400	19800	17700	14700	9300	4360	103000
Less present heating gas made mcf	269	425	1580	3120	4570	5230	4650	3850	2400	1075	26900
Additional gas to be made for 5% saturation	761	1215	4520	8880	12830	14570	13050	10850	6900	3285	76100
Av net daily hrs of operation @ 95 mcf/hr (8' set)	8.	.425	1.5	3.1	4.5	5.1	4.5	3.8	2.4	1.1	
No of 8 hr shifts charged to water gas operation	1	1	1	1	1	1	1	1	1	1	
No of water gas sets in operation	2	1	2	2	2	2	2	2	1	1	
Plus spare sets	1	1	1	1	1	1	1	1	1	1	
Total number water gas sets	3	2	3	3	3	3	3	3	2	2	
Av No water gas makers on duty/day	1	0	1 man 11hr/wk	1 man 22hr/wk	1 man 32hr/wk	1 man 36hr/wk	1 man 32hr/wk	1 man 27hr/wk	1 man 17 hr/wk	1 man 8 hr/wk	
Total hours water gas maker labor			47	95	137	154	137	116	73	34	793
Total hours water gas maker helper labor											793

3 water gas sets necessary.

	Annual Hours Total xx	Charged to Add W.G.	Charged to Maintenance
Organization should include 1 W.G. maker	2500	793	1707
" " " " " helper	2500	793	1707
	5000	1586	3414

We did not add 1 additional shift to break the above shifts because we would have such labor available.

xx based on 48 hr. work week

(Continued on page 29)

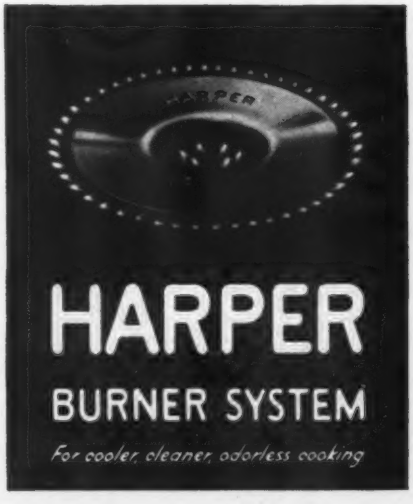
"What woman *wills*... will be"

98% want 2-in-1 Top Burners*

WHEN WOMEN made it known that they were "fed up" with the discomfort of open cars, wise manufacturers concentrated on closed models. And today, 98% of modern housewives are dissatisfied with antiquated top burners. They want a *dual purpose* burner... giving one heat for frying and to *start* foods boiling, and another separate heat to *maintain* the cooking.

Only the Harper Burner System does this. Each burner is actually 2 burners in 1... a burner within a burner... both operated and controlled by a single handle. The small, inner *cooking* burner can be used entirely independently of the outer *starting* burner. No other top burner possesses this vital advantage—which insures easy, accurate control: just the right heat for every type of top burner cooking.

Thus, the Harper Burner System is the top burner *answer* in the AGA campaign of appliance improvement and promotion to augment the position of gas as the ideal cooking fuel.



**Result of independent survey in which thousands of housewives were interviewed on their preferences in a postwar range.*

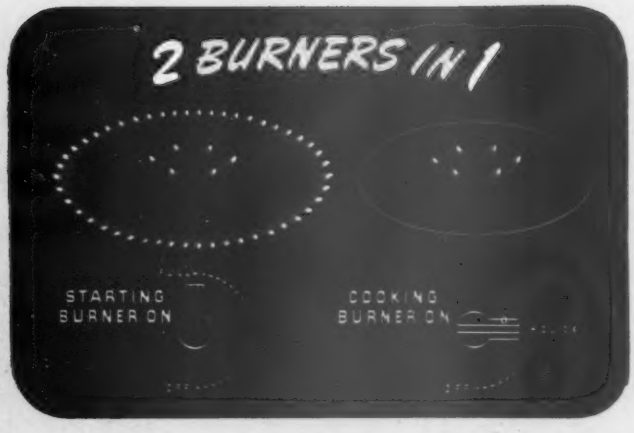
Copr. 1945, Harper-Wyman Co.

On next page
WHAT USERS SAY

"Less dirt, less odor, MORE ECONOMY"

Mrs. Anna M. Livingston, minister's wife living at 111-08 Ozone Park, New York, says:

"I have found the Harper Burner System the answer to the problem of odors and dirt caused by cooking. And, of course, the Harper Burner System gives far better cooking results, while using less gas."



The Harper Burner System operates on the unique principle of "2 burners in 1"... a STARTING BURNER plus a small, economical COOKING BURNER, both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner made.

Mrs. Livingston is right!

THOUSANDS of housewives can attest that their homes are *cleaner* since they began cooking with a Harper Burner System equipped range. Here's the reason:

The Harper COOKING BURNER is adjustable to lower heat levels than ordinary top burners—it's easy to keep the cooking water in a covered vessel just at the boiling point. This means that less steam, carrying odors and grease particles, escapes. Cleaning bills are lower because curtains, drapes, walls and window screens don't become soiled as easily.

NOTE: A *new* and *improved* Harper Burner System will be ready when manufacturers can resume production of de luxe ranges. Harper-Wyman Company, 8562 Vincennes Avenue, Chicago 20, Ill.

HARPER BURNER SYSTEM

"HOLDS THE LINES FOR GAS"

HARPER BURNER SYSTEM

—One of the standards of top burner performance under cp

TABLE IV - 10% SATURATION DATA

	Peak Day	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
Per Cent of total Sales		1.6	5.9	11.6	17.0	19.3	17.2	14.3	9.	4.1	100
Gas Sales mcf	1870	2980	11000	21800	31500	36000	32000	26700	16800	8220	187000
Less present heating gas sold mcf	248	395	1460	2860	4200	4800	4250	3560	2230	1045	24800
Add gas to be sold for 10% saturation	1622	2585	9540	18940	27300	31200	27750	23140	14570	7175	162200
Gas made mcf (4% unacctd)	1960	3150	11600	22730	33330	37730	33530	27930	17700	8300	196000
Less present heating gas made mcf	269	425	1580	3120	4570	5230	4650	3850	2400	1075	26900
Add gas to be made for 10% saturation	1691	2725	10020	19610	28760	32500	28880	24080	15300	7225	169100
Aver. net daily hrs of operation @ 35 mcf hr (8' set)	17.8	.95	3.5	6.8	10.	11.4	10.1	8.5	5.3	2.5	
No. of 8 hr shifts charged to water gas operation	3	1	1	2	2	2	2	2	1	1	
No. of water gas sets in operation	2	2	2	2	2	2	2	2	2	2	
Plus spare sets	1	1	1	1	1	1	1	1	1	1	
Total no. of water gas sets	3	3	3	3	3	3	3	3	3	3	
Av. No. of water gas makers on duty/day	2	0									
No. of men - Hrs./wk			1 - 24	1 - 48	1 - 48 1 - 22 1 - 28 to clinker	1 - 48 1 - 32 1 - 28 to clinker	1 - 48 1 - 23 1 - 28 to clinker	1 - 48 1 - 12 1 - 28 to clinker	1 - 37 1 - 28 to clinker	1 - 17	
Total hours water gas maker labor			104	206	420	465	425	380	280	73	2353
" " " " " " helper											2353

3 water gas sets necessary

	Annual Hours Total xx	Charged to add W.G.	Charged to Maint.
Organization should include 2 W.G. makers	5000	2353	2647
" " " " " helpers	5000	2353	2647
	10000	4706	5294

We did not add 1 additional shift to break the above shifts because we would have such labor available.

xx based on 48 hr. work week

(1) holder costs of gas per mcf made and sold.

(2) production investment cost per customer and carrying charges for such investment per mcf sold.

The basic data from which subsequent quantities or costs will be determined are shown in table #1.

The details of the data shown in the column headed 2% in table No. 1 are shown in table No. 2 which is for gas where 2% saturation will obtain. The purpose of this table is to obtain figures which will determine:

(1) Number of water gas sets required.

(2) Number of water gas makers and helpers required.

(3) Allocation of total annual hours of such makers and helpers and the proper charges therefor to maintenance.

Tables number 3 and 4 are similar in purpose to table number 2 and refer respectively to the cases of 5% saturation and 10% saturation.

Summary of Tables

To summarize the results shown on tables 2, 3 and 4 we find that:

For 2% Saturation:

(a) We need 3—8' water gas sets —1 water gas maker and 1 water gas maker helper.

(b) Total hours chargeable to water gas labor 403 hours for makers. Total hours chargeable to water gas labor 403 hours for helpers.

(c) Total hours chargeable to maintenance or other work at the plant.

Total hours chargeable to makers 2097 hours. Total hours chargeable to helpers 2097 hours.

For 5% Saturation:

(a) we need 3—8' water gas sets —1 water gas maker and 1 water gas maker helper.

(b) hours chargeable to water gas labor 793 for makers. Hours chargeable to water gas labor 793 for helpers.

(c) hours chargeable to maintenance or other plant work. Hours chargeable to makers 1071. Hours chargeable to helpers 1071.

10% Saturation:

(a) we need 3—8' water gas sets, 2 water gas makers and 2 helpers.

(b) hours chargeable to water gas labor 2353 for makers. Hours chargeable to water gas labor 2353 for helpers. Hours chargeable to maintenance or other plant work. Hours chargeable to makers 2647. Hours chargeable to helpers 2647.

In estimating the additional labor that will be required in our plant to make the additional gas, we took into consideration the number of hours the sets are to be operated under peak conditions and found that under table 2 we would only need to hire an additional water gas maker and an additional helper; the shifts could be changed and the one day in seven off duty could be handled by our present employees at the plant.

The 4,194 excess hours available during the off-peak periods of the year from the additional gas maker and his helper could be used in maintenance work such as painting buildings and fences, repairing leaking lines, etc. The hours worked are based on a forty-eight hour week with time and one-half for all hours worked in excess of forty in any week.

For the operations under table 3 the same additional gas maker and helper is required and no additional labor is estimated for days off or to change the shifts. However, in this case the hours charged to additional water gas made amount to 793 for the maker and 793 for the helper, leaving 1707 hours to be charged to

TABLE V SUMMARY OF INVESTMENT

	2%	5%	10%	
Sets, blowers, blastmain, hand clinkered with automatic control	$60000.			
Purification apparatus for 2 sets operation at same time	50000.			
Add. cooling & condensing equip.	10000.			
" Cottrell Precipitator	6000.	Same as		
New Boiler - 150 HP @$50/HP	7500.			
Station meter 100 mcf/hr & connections	3500 .	2%		
Exhauster	5000.			
Foundations & Buildings	53000.	Saturation		
Gas piping valves & steam piping	20000.			
Small piping	5000.			
Storage holder 500 mcf HiPres Str @ 13¢ cf	65000.			
Compressor for pumping above 50 mcf/hr	12000.			
	$297000.	$297,000.	$297000.	
			5000.	Misc. additional pumps & conns., salt water-tar-hydraulic-feed water
			3000.	Additional 100,000 gal oil tank
			7500.	Another boiler 150/HP @ $50
			7000.	Additional tar separator & additional dehydrator
			2500.	Bldg. for compressor
			5000.	Gas piping additional
			40000.	200 mcf relief holder and connections
			26000.	200 mcf Hi pressure storage @ 13¢ /cf
			12000.	50 mcf/hr compressor
13% carrying charge			$ 405000.	
	38400.	38400.	52500.	
Carrying charge mcf sold on excess gas over present load	2.38	.525	.325	
Investment per customer (150 less 86) over present customer	4650.			
" " " (375 less 86)		1020.		
" " " (750 less 86)			612.	

maintenance for each, the maker and the helper. This also means that additional maintenance work will have to be found in the off-peak periods of the year to use up 3,414 hours that will be available from these two men.

Under table No. 4, much more additional gas will have to be made. Therefore, it will be necessary to put two water gas makers and two helpers on the payroll of which 2,353 hours will be charged to water gas manufacture for each of them and 2,647 hours for each of them will have to be charged to maintenance.

It will be noted in table 5 that $297,000 of capital expenditure will be necessary to serve an increase of .86% in house heating customers because the existing plant is producing at its maximum capacity. This produces a carrying charge of $2.38 per mcf sold on the excess gas made over and above the present house heating load. This item, however, drops rapidly to 52½c per mcf on the same basis at 5% saturation because no additional capital expenditure is necessary to produce the gas required for 375 house heating customers under this classification, and this is still further reduced to 32½c for the excess gas necessary to be made when 10% of our customers become house heating customers because of the much greater amount of gas made with an increase in capital expenditures of only $108,000.

The 13% carrying charge is composed of the following items—4% taxes, 5% depreciation and 4% interest. Our calculations do not include:

Social Security Taxes
Unemployment Taxes
Public Liability Insurance
Property Damage Insurance
Fire Insurance
Pension Expense
Stores Expense
Transportation Expense
Supervision Expense

this classification because at the moment it is not definitely known how the additional man hours of labor available from these two new employees could be used to advantage, therefore, the excess cost was charged directly to water gas labor. Boiler fuel cost per M made is high because one additional boiler would be installed and in operation under the 2% classification and it would only be used a small part of every day for 3 months which involves high stand-by operating costs to keep it under fire during the large portion of each day that it would not be steaming during three months.

Labor in the 5% classification drops very considerably to 7c per M because of the increase in the amount of gas made which absorbs a high percentage of the time of the two men whom we will hire under the 2% classification.

Boiler fuel is estimated to cost 5.8c per M which is made up of 3.8c our normal boiler fuel cost per M made, plus 2c per M made to store the additional gas in high pressure storage tanks.

Conclusions

(a) any small plant cannot sell additional house heating gas at a profit at existing gas rates when it takes on 2% or 5% or 10% of its domestic customers as heating customers.

(b) in our situation an entirely new plant would have to be built if we took on more than 10% of our domestic customers for additional house heating.

TABLE VI - HOLDER COSTS

		2%	5%	10%
	Supervision Labor	.30	.07	.063
1.	Boiler fuel	.13	.04	.058
	Water	.008	.008	.008
2.	Generator fuel	.135	.135	.135
3.	Water gas oil	.162	.162	.162
	Misc. Works Expense	.014	.014	.014
	Maintenance	.03	.03	.03
		.779	.459	.470
	Residuals produced credit	- .027	- .027	- .027
	Net holder cost of additional gas/M made	.752	.432	.443
	Net holder cost of additional gas sold/M	.79	.45	.460
	Carrying charge/M sold	2.38	.525	.325
	Total per mcf sold	3.17	.975	.785

1. - Operating one additional boiler part of each day for three months for 2% saturation. Cost of solid fuel $8.13 per ton and liquid fuel (tar) 4¢ per gallon. In the 10% column we estimated the cost of boiler fuel per M made to be .058 the excess fuel for year ending August 1944, plus 2¢ per mcf additional for storing gas at high pressure.

2. - Cost of generator fuel based on 10.63¢ per ton.

3. - Cost of oil based on .062 per gallon.

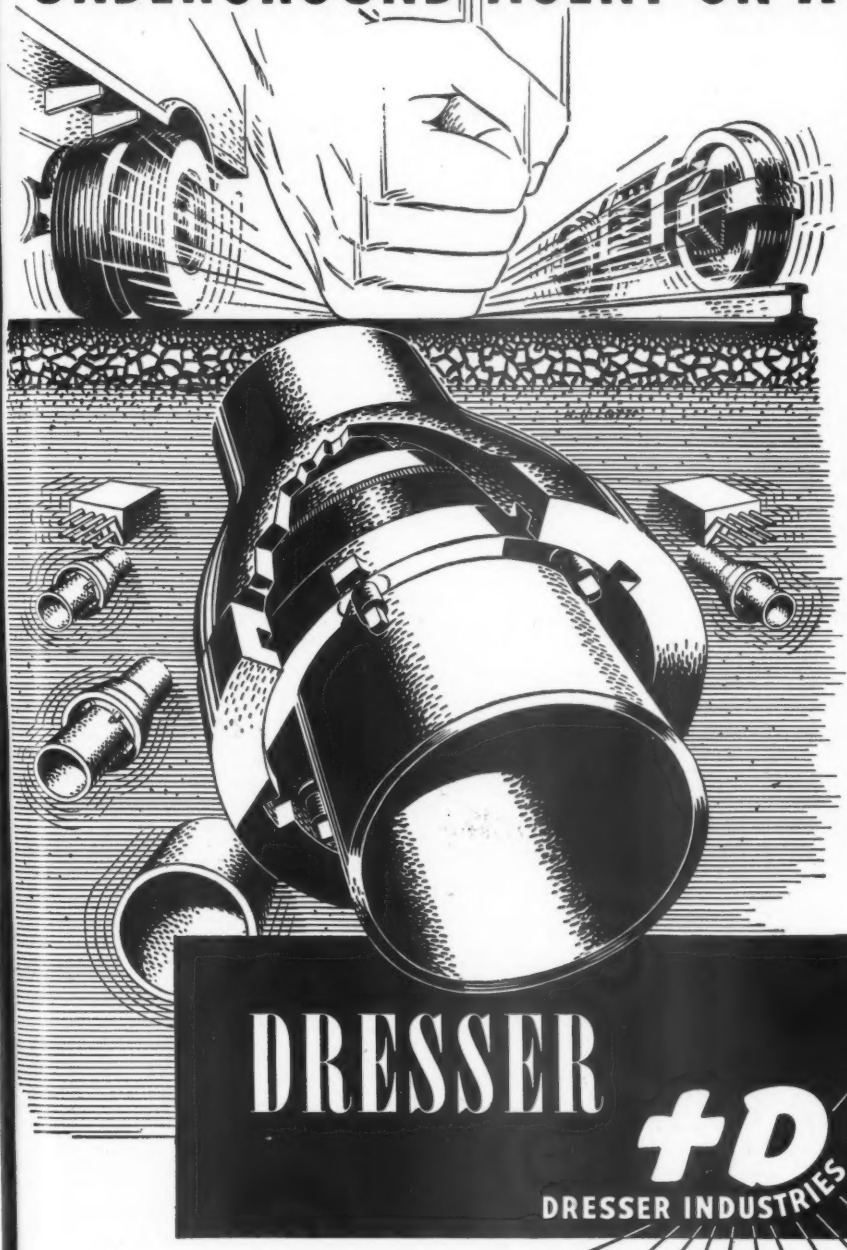
Table No. 6—Holder Costs:

The high cost of supervision and labor in the 2% bracket is due to absorbing practically all of the excess labor (4194 hours) which would ordinarily be charged to maintenance in

(c) some new method to produce gas must be developed that will decrease holder cost and fixed charges.

Presented at the Company Managers Conference, New England Gas Association, Boston, Mass., October 20th, 1944.

UNDERGROUND AGENT ON A PUBLIC MISSION



Thunderous tons of traffic shake the earth far below our city streets. The vast gridwork of transportation pipes for gas and water vibrates day and night. In one of our largest cities are over 7000 miles of gas mains alone, with a joint on the average of every twenty feet.

If a joint springs a leak, the street must be dug up; traffic is detoured; nerves are jangled with hammering, and the utility foots the expense.

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COLUMBIA GAS & ELECTRIC CORPORATION

COLUMBIA SYSTEM

Home Service Personnel—Their Selection and Development

By
Fred A. Herr

A COMPREHENSIVE program for developing competent gas utility home service department personnel has been prepared under the title of "Pattern for Training Home Service Representatives," by R. C. Terradell, supervisor of sales training, Southern California Gas Co., Los Angeles.

Presenting the program at a recent meeting in Los Angeles of home service department directors and personnel of west coast gas companies, Mr. Terradell prefaced his discussion with the following statement:

"After the decision has been made to proceed with a training program, the first important step in its administration is to determine *who* will be trained. Once this has been established, the next logical consideration is to set down the detailed duties of the work classifications involved."

In outlining the plan, Mr. Terradell then set forth that if the project is to be developed for home service representative training, a detailed statement of job duties would include such factors as these:

Select, store, preserve, prepare and cook foods of all types; using approved cooking principles, bake cakes, pies, cookies and hot breads; cook vegetables both by the oven or top burner method; bake, roast, stew, fry and broil all kinds and cuts of meat, applying the recommended method to the cut of meat involved; bake, fry and broil fish and other sea food as the method applies; roast, stew and fry all kinds of fowl; can and dehydrate fruits and vegetables; prepare jellies, jams, preserves and relishes; pickle vegetables and fruits disseminate information on nutrition principles; conduct public demonstrations of the foregoing processes.

The statement of job duties, should also include the making of request home service calls prompted by the customer's desire for assistance on refrigeration, baking or other specific cooking problems; the making out of reports in narrative style as well as with forms; use of telephone to take incoming calls from the customer and other company departments, or to make calls to customers or other firm departments; the answering of questions pertaining to the gas industry in general and company policies and practices; the making of minor adjustments on range top and oven burners and pilots, calibrating range oven controls, and checking levelness of range ovens.

After the specific job activities of the home service representative have been developed, the third step in developing a training program would consist of outlining the qualifications which a candidate should possess to enable her to perform the duties of such work assignment. Certain of these qualifications, would be looked for, and obtained, by the local selection and hiring method, while other special abilities would have to be developed through training which would follow after employment.

He said that, basing the list of personal requirements on the proposed job duties, it would appear that the home service representative should

1. . . . Be mentally and physically qualified for the assignment.
2. . . . Be adequately trained in home economics.
3. . . . Be well grounded in her knowledge of the gas industry and be familiar with manufacturers' products involved in her work.
4. . . . Be familiar with the work of the A.G.A. Testing Laboratories and those operated by her company.
5. . . . Know her firm's procedure in the production or manufacture, transmission, compression, storage, regulation, measurement, distribution and sale of gas.
6. . . . Be familiar with combustion, flame characteristics, fundamentals of burner design, venting and utilization of domestic appliances, particularly the range and refrigerator.
7. . . . Be able to calibrate domestic gas range ovens and make simple air adjustments on the range top and oven burners.
8. . . . Know the geographic and departmental organization of her firm.
9. . . . Have knowledge of current, pertinent appliance information.
10. . . . Be familiar with the service department's organization, function and policies.
11. . . . Be able to use whatever tools, special instruments and utensils are required to execute the established duties of her work classification, including: oven thermometer, spirit level, screw-driver, pliers, adjustable open-end wrench, pressure cooker, dehydration equipment, measuring cups, measuring spoons, layer cake pans, pie pans, cookie sheet, spatula.
12. . . . Have available, and know how to use, company recipes and other literature.
13. . . . Know the public relations policy of her company.
14. . . . Know how to dress appropriately for the work.
15. . . . Know how to drive an automobile.
16. . . . Know how to use maps.
17. . . . Have the ability to write reports, as required.
18. . . . Know proper telephone technique.

Laying Out Training Prospectus

The fourth step in establishing the training program is the presentation of a prospectus for outlining the suggested course of training.

This prospectus should outline the job duties, requirements, curriculum, method of presentation, training facilities, such as class room, equipment, audio and visual aids, etc.; approximate length of the training period, its over-all cost and cost per student.

When completed, the prospectus should be submitted to management for review and approval before the actual work of preparing the course of training is inaugurated.

With national and local references as source material, classroom presentations, he said, should then be written in the form of lectures following the demonstration, discussion and group participation pattern publicized by the War Production Board's Training Within Industry program. Using the list of requirements previously outlined, which in turn were based on the job duties to be performed. Each lecture thus is aimed at a definite training objective.

He suggested that consideration be given to visual, audio and other train-

ing aids which will be used to administer each component lecture of the course, so that such provisions can be written in as they apply. Art work, such as diagrams, schematic drawing, platform arrangements should also be included, as well as photographs which are proposed for stereoptican projection. Each lecture when completed would then represent a complete unit, separate from the others.

Recommending that company departmental viewpoints be reconciled before the course be submitted to management, Mr. Terradell said:

"Lectures which are confined to separate subjects are easily reviewed by the interested departments during the course of reconciliation, which should always preceed the final review by management. They have the added advantage of being more wieldy in an instructor's hands, since consideration need not only be given to equipment and supplies for a single training project. Furthermore, the students' attention is focused on limited subject matter which improves the learning process.

"Once all viewpoints have been reconciled with the interested company departments followed by management's review and approval, classroom facilities and teaching properties become the next order of business, since by then these requirements will be definitely known."

Classroom Facilities

Mr. Terradell suggested that a classroom be set aside for instruction purposes, adequately equipped to accommodate the largest number of students anticipated at one time. Such a room, he declared, should have a model kitchen installed at one end, preferably on a raised platform. A screen mounted on a roller near the ceiling for stereopticon slides should also be installed at the platform end of the room.

Where the existing training facilities of the service department are unavailable for use in presenting the utilization phase of the training program, provisions be made for the installation of operative representative types of gas appliances along either wall of the classroom, including cutaway models.

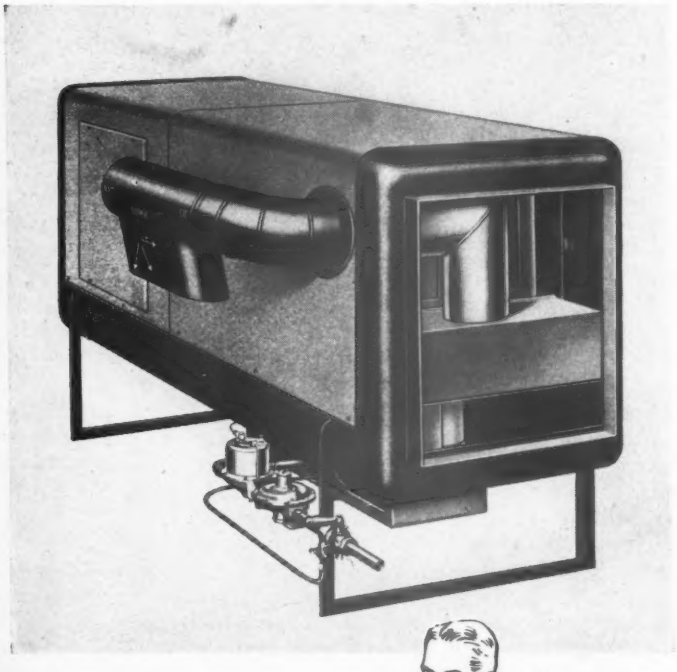
In selecting an instructor for the teaching assignment, he stressed the importance of giving careful consideration to the employee's personality, background of experience and training, her overall knowledge of the subject matter to be taught and, finally, her interest in the work.

The Home Service Director should next review the program in considerable detail with the instructor, the pattern for training set forth. Besides the general plan, objectives and training policies, he emphasized the essentiality of the instructor being advised of the specific training routines desired, the method of administration and critical standards which the student will be expected to meet.

"It would help considerably," Mr. Terradell stated, "if the home service director herself actually gave the course to the instructor. Where her departmental activities preclude this, the director should provide ample time for the instructor to develop the training routines, etc., under her supervision."

Suggested Curriculum

He further suggested that in order to meet the requirements of her future work assignment the home service representative be required to include the following curriculum: Gas industry, A.G.A., P.C.G.A., A.G.A.E.M., A.S.A., manufacturers, and company geographic organization, departmental policies and functions of the sales and home service departments; production, transmission, storage, distribution, regula-



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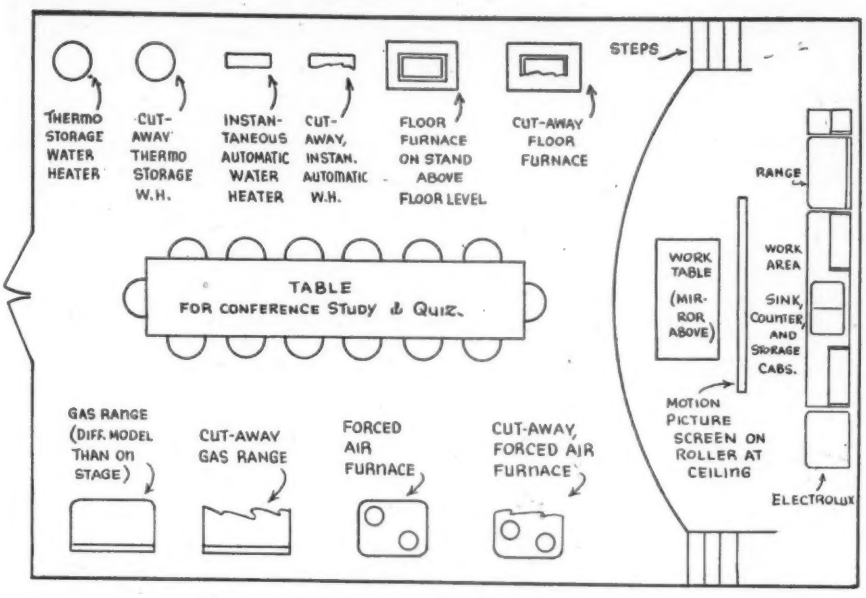

Proposed Floor Plan of Classroom

tion, measurement, combustion, flame characteristics, burner design and domestic appliances; cooking principles, nutrition principles; and demonstration assignments.

The pattern prepared recommended that the training be continuous and unbroken throughout the entire course, rather than be conducted on an interrupted, or "stop and go" basis. He stressed that this is particularly important where new people are involved, since their early impressions are shaped by the presentation of valid information.

"The controlled logical sequence in which their training progresses during a 'non-stop' course produces qualified, productive employees at a more rapid rate. An organized training program is actually an instrument which carries out the desires of the management. It is a means of producing a common viewpoint among a group of employees all of whom are talking the same language to the customer. This desirable objective is easier to attain when the training material is first reconciled with the interested company departments and subsequently reviewed by management. Further assurance of uniform approaches is to be had where the training course is reproduced for distribution not only to all employees of the work classification trained, but to interested supervision and management as well."

Critical Performance Standards

He urged that critical performance standards be established early so that the results of training can be measured during, and at the completion of the course. Besides being helpful in determining the effectiveness of the programs, he pointed out that such standards increase the probability of releasing qualified personnel for work assignment. Objective measurements, he declared, while highly desirable, may not be developed rapidly for every phase of the work, in which case less tangible appraisals must be employed, based on the instructor's personal opinion.

To insure maximum control, all training should be given on company time with provision made for study periods during class sessions. This policy will eliminate the handicap of a fatigue factor, increase student cooperation, and result in greater receptivity.

"The instructors, however, should maintain a neutral attitude toward home study by neither discouraging it or pointedly encouraging such effort. Texts in the form of lecture reproductions, passed out to the students at the conclusion of each lecture, will make it possible for students to engage in outside review, if they desire. If they prefer not to study on their own time, not much harm results if they have been well taught in class."

In conclusion, he emphasized that his pattern for training home service representatives had been offered only as a general approach to home service training rather than as a detailed statement of procedure, being in the nature of a starting point from which such a training program can be developed to meet the particular local requirements of a utility not so engaged.

"Its purpose is to provide a pattern for training designed to qualify candidates in the shortest period of time at the least expense.

"Since the subject of training lends itself readily to controversy, it is important carefully to review the possibilities of any program which is under consideration before making changes arbitrarily. Past experience and tested methods are two means of forecasting the probability of future success with reasonable accuracy. The best criteria, however, are the results which are obtained after the plan has been put into effect, and modifications, additions and deletions can then be made to attain specific objectives."

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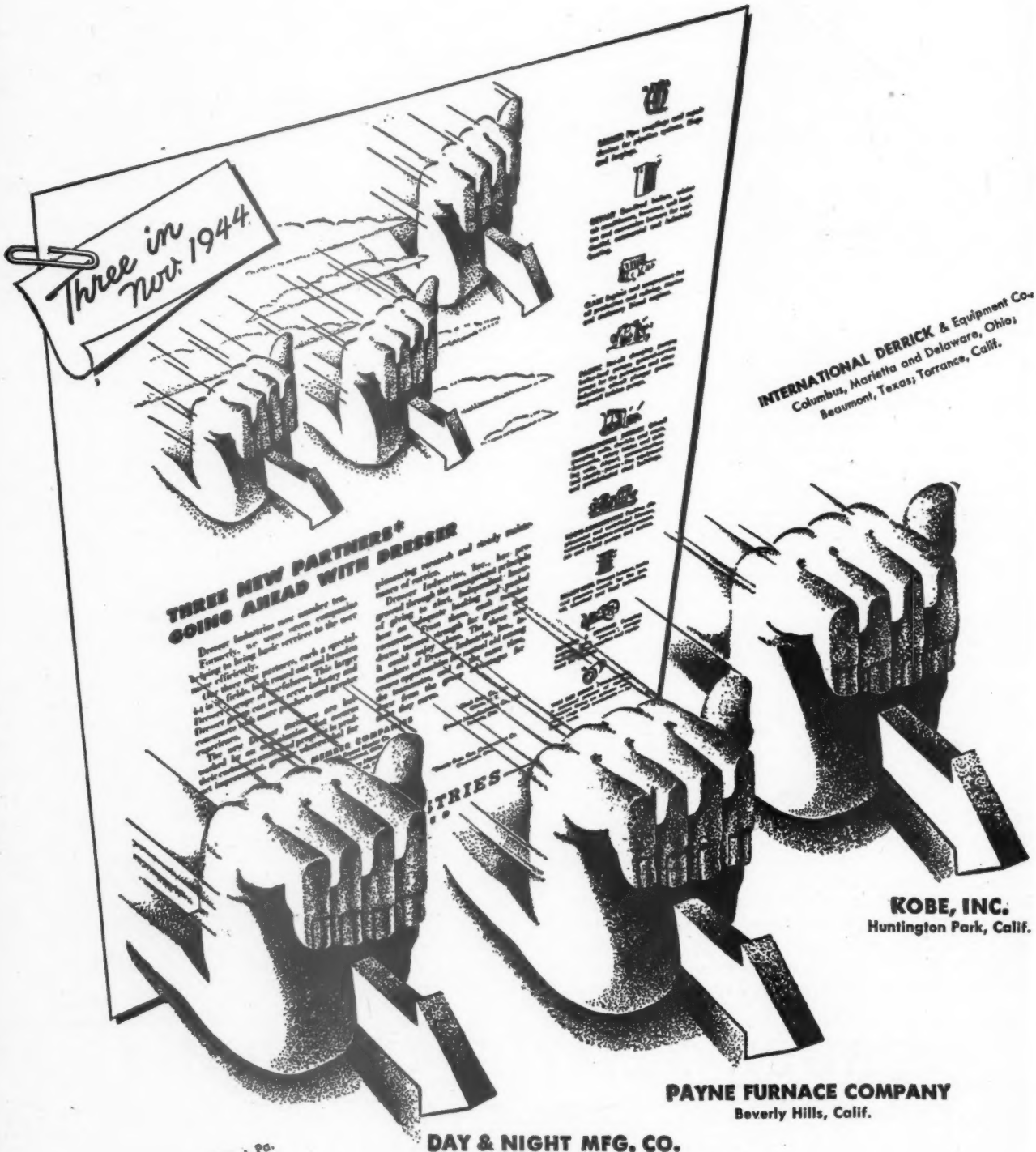

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Appliance Testing and Gas Measurement Laboratories in Los Angeles

THE Southern California Gas Co. and Southern Counties Gas Co. served as hosts to several hundred executives of gas appliance and equipment manufacturers and other gas industry representatives at an invitational "Open House" on March 19 which marked the official dedication of a new and modern Gas Appliance Testing Laboratory sponsored jointly by the two Los Angeles utilities.

Opening of the appliance laboratory was the second of two important expansions in technical research facilities undertaken by the Los Angeles gas companies since the first of the year. A month previous, Southern California Gas Co. placed in operation a new Gas Measurement Laboratory designed to check the heating value and specific gravity of natural gas. This latter project will be described in more detail further along in this report.

The new appliance laboratory is situated on the third floor of the Southern California Gas Co.'s engineering building. Spacious quarters have been equipped with the most modern apparatus obtainable at this time for conducting research in connection with appliances and gas utilization and for making efficiency and quality tests.

The purpose of the new gas appliance laboratory, Guy Corfield, director of the research department, Southern California Gas Co., told *American Gas Journal,* is to co-operate with and assist local appliance manufacturers in matters beyond the tests made at the A.G.A. West Coast testing Laboratory.

To Issue Results of Tests

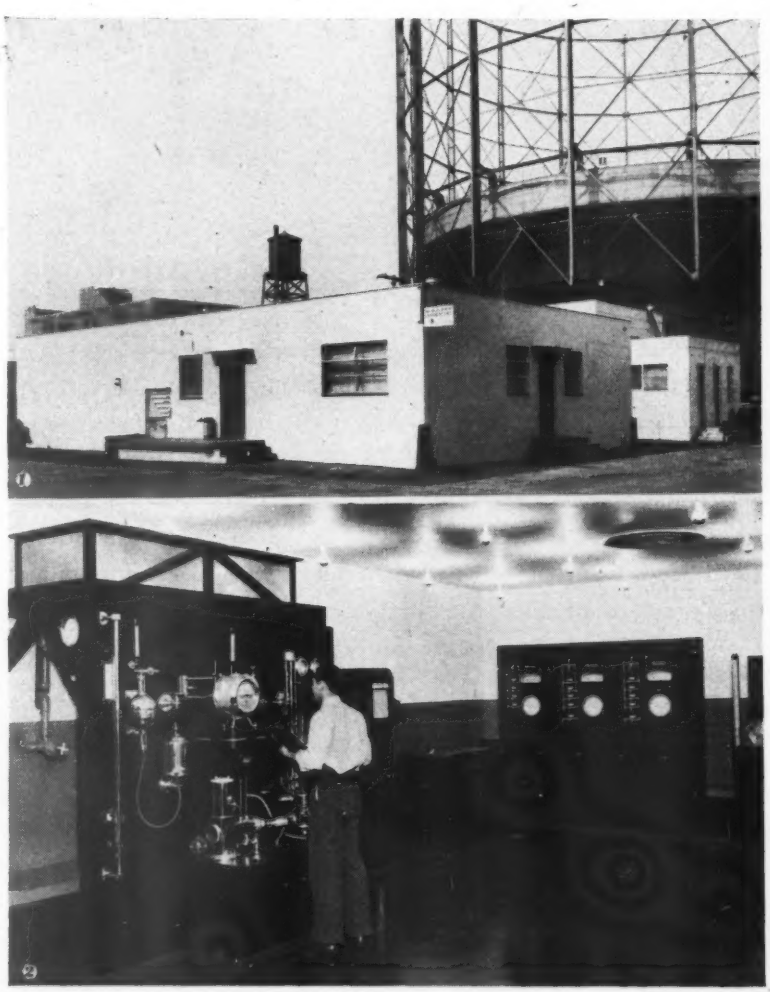
The joint gas company laboratory, Mr. Corfield, explained, will report to the manufacturer whether an appliance, by test, measures up to the requirements of the gas industry, or fails to do so; and will go beyond that by giving the manufacturer details of the various tests in percentages and ratios below or above the predetermined "approval" point for an appliance of the type tested.

The AGA laboratory's approval, Mr. Corfield pointed out, is a guaranty that the appliance conforms to a certain set of basic standards in construction, performance and safety. This laboratory, he explained, aims to reach beyond that point by determining the extent to which an appliance surpasses basic requirements, and, in general, to provide an appliance testing service to supplement the services provided by the AGA's establishments in Cleveland and Los Angeles.

9000 Sq. Ft. Floor Area

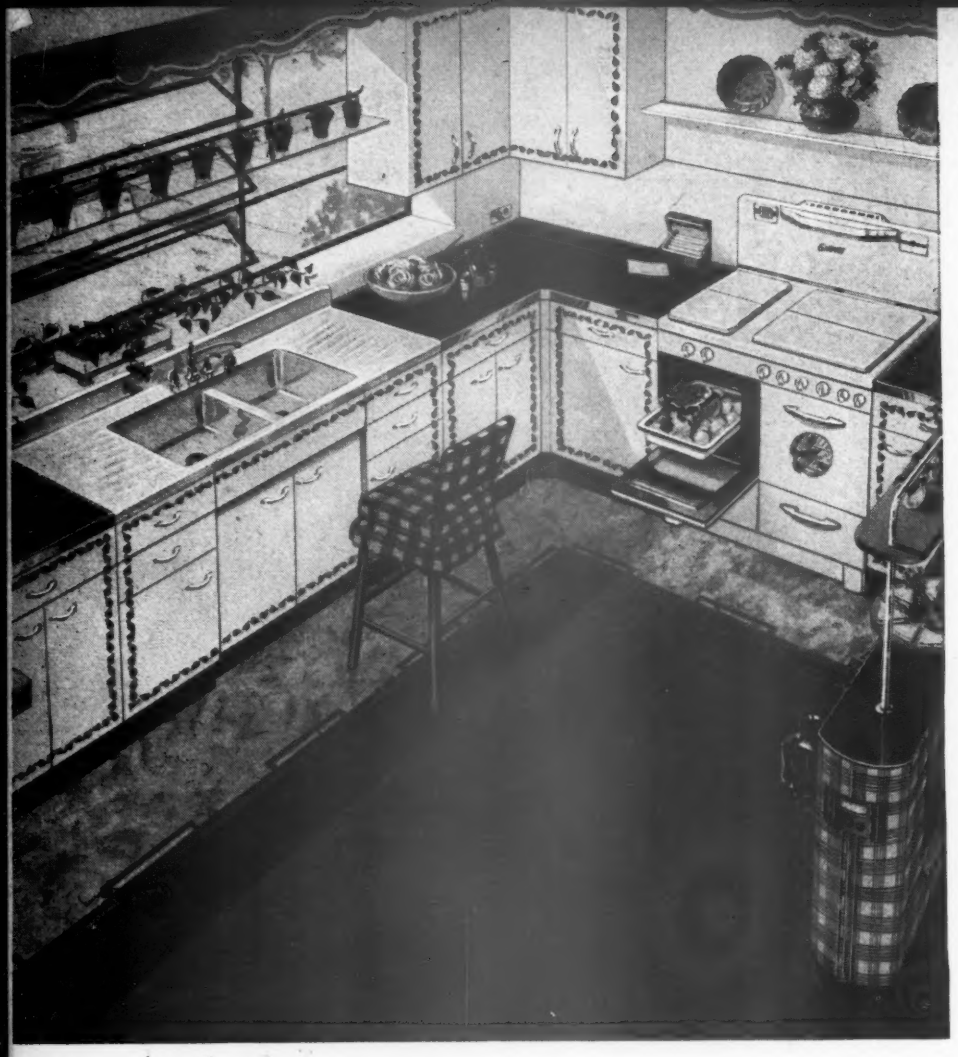
The new appliance testing facilities occupy an area approximately 50 by 150 feet in dimension on the third floor of the Santa Fe Avenue building. Various smaller test and constant temperatures rooms which adjoin the main testing section bring the total floor area to approximately 9,000 sq. ft. The area has been scientifically laid out to meet the complete needs of a modern appliance testing laboratory.

The main appliance testing section is a high-ceilinged chamber. The space covers an area of 40x80 ft., minus the 20x20 ft. area of a chemical laboratory. Glass panels rising



1:—Exterior view of building erected to house a new gas measurement laboratory which was established early this year at 1700 Santa Fe Ave., by the Southern California Gas Co.

2:—The instruments shown here constitute part of the gas measurement laboratory's equipment for checking the heating value and specific gravity of natural gas. The instruments (reading L to R) are: Foreground, Junkers type calorimeter; recording calorimeter and (rear wall) Ranarex recording gravitometer. With the Ranarex is obtained a continuous record of the specific gravity of the natural gas passing through.



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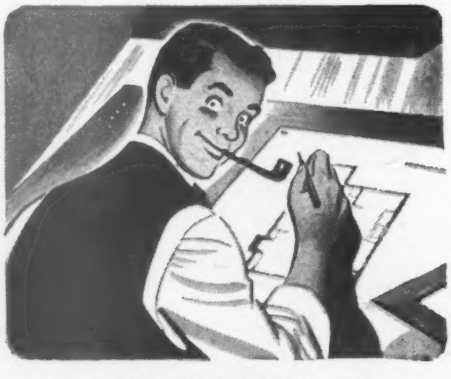

EVERY ARCHITECT KNOWS there are trend-setters in every field. And through the years, no range has been so consistently out in front with the newest features and advanced design as the Estate Heatrola Range.

Estate Heatrola Ranges are made by THE ESTATE STOVE COMPANY, Hamilton, Ohio — First with the finest for over 100 years.

from a three-foot-high wooden wall make the interior of the chemical laboratory visible from the testing room.

Individual Booths House Equipment

As shown in the accompanying photograph, Figure 3, an arrangement of shoulder-high, open-top booths has been decided upon as the most effective way of setting up the various units of testing apparatus. On opening day approximately a dozen such booths were in place, with the equipment hooked up to make demonstration tests for the benefit of the several hundred domestic and commercial appliance and accessory manufacturers, dealers, city and county inspectors and utility representatives who visited the laboratory. Laboratory staff members served as guides to small groups of visitors and explained how the various units functioned and the purpose of the tests.

Larger equipment units, such as bulky potentiometers and recording calorimeters are spotted in convenient locations along the walls. A working gas kitchen, housed in a separate room opening from the appliance testing section, is equipped to make actual baking and cooking tests. Reflectometers, for instance, are available, for evaluating the degree of brownness of cakes, and various other equipment for conducting cooking and baking tests in the latest approved manner.

Another separate department is a constant temperature room equipped for performing tests for which unvarying temperatures are essential.

Opening from the main test section are two smaller private test rooms which can be placed at the disposal of appliance manufacturers who wish to make confidential experiments or tests. Adjoining the test rooms are a tool room, workshop for repairing instruments and making small parts, and a large storage department in which equipment and instruments used only occasionally are stored until needed.

Gas Consumption Tests Made

The main appliance test section is equipped to make combustion tests on all sections of a gas range as well as tests for top section, speed of preheating and gas consumption, both as to coming to heat and maintenance of heat on oven and broiler.

One booth is devoted to making top burner combustion tests on ranges, as part of which test a sample of heat vapor is withdrawn with a rubber vacuum ball and given final tests in the gas analysis room.

Equipment for making efficiency tests for top burners is installed in another booth. These tests are made to determine if the range complies with the time requirements of bringing water to a certain temperature. On the whole, the test in that category is designed to determine how long it takes a given weight of water in a definitely shaped and sized vessel to reach a certain degree of temperature at a given gas input to the burner, and thereby to determine the efficiency of the burner properly to apply heat to the vessel containing the water.

Thermo-couples are used for checking oven and broiler heat distribution and testing exterior surface temperature of the range to ascertain if the heat is confined to the oven or is coming through the surface material of the range.

Among the general equipment of the gas appliance laboratory are Brown potentiometers, Cutler-Hammer recording calorimeters, gas analysis apparatus of various types, devices for appraising gas heating value, carbon monoxide testing equipment, standard vessels for efficiency tests, reflectometers for evaluating the degree of brownness of cakes, and a complete array of chemical laboratory and test kitchen equipment.

Facilities for Water Heater Tests

The equipment for testing gas water heaters includes (in addition to water and gas meters and other conventional units) thermometers for determining how much water can be heated to a given temperature with a certain input of gas, and to check the rapidity of recovery from "cold" to "hot."

In the course of the laboratory's work, Mr. Corfield declared, virtually every type and make of gas water heater is tested. Appliances worked upon either are sent in voluntarily by the manufacturer to be tested, or, in some instances, are tested at the instigation of the gas companies.

Among the equipment in use are instruments for recording temperature, humidity, air velocity, air resistance, air entrance and other phases of heat control and measurement; equipment for making observations of many types of heating equipment in the matter of temperature of different rooms in the same house and on temperature distribution; for determining the speed of room heating from "cold" to "comfort" heat; the amount of gas required to keep a house of given size and type at various degrees of temperature differentials between outside and inside; and devices for measuring the amount of air which infiltrates into a house through cracks at the doors and windows.

3:—General view of new Appliance Testing Laboratory opened in March by Southern California Gas Co. and Southern Counties Gas Co. at 1700 Santa Fe Avenue. Groups of men shown here are appliance manufacturers, distributors and others who were guests of the companies at an "Open House" held on March 19.

Some of the test equipment is visible in this view. Shown in foreground, is equipment set up for making top burner combustion tests. The layout of the main testing section is featured by the use of low, open-topped booths.

4:—A view of interior of department for testing and repairing laboratory instruments.

Note specially built low-hung truck (right foreground), designed for convenient moving about of the 1000-lb. recording calorimeters.

The newly opened gas appliance testing laboratory is a unit of the company's research department, which is headed by Guy Corfield. Henry L. Warren is laboratory supervisor, directing the activities of a staff of nine technicians, most of whom are college graduates in technology or home economics. The major undertaking of the laboratory at the present time deals with postwar appliances and gas utilization, it was announced.

New Gas Measurement Laboratory

Earlier this year, the Southern California Gas Co. completed construction on a new gas measurement laboratory which is said to rank among the most up-to-date installations of its kind in the United States. This laboratory is housed in a new one-story building. (See figure 1). Approximately 3,000 square feet of

floor area have been provided for the various instruments required in checking the heating value and specific gravity of natural gas, and for the necessary office and repair areas.

The function of the Gas Measurement Laboratory is two-fold: to test the heating value of the company's natural gas supply; and to check the specific gravity of the gas to obtain the record necessary as one of the factors of meter co-efficients used in orifice meter measurements.

Gas Air-Conditioned Instrument Room

The instrument room, in which the bulk of the instruments are installed, is completely air conditioned with a Servel all-year air conditioning system. Air control, Mr. Corfield pointed out, is necessary in the laboratory in order to assure the constant temperature and humidity conditions required for the test work.

Major equipment units in the new gas measurement laboratory include:

A Cutler-Hammer automatic recording calorimeter with which tests are made to determine whether the gas supply contains the required nominal heating value of 1100 B.t.u. This instrument is used to measure all heat generated by the combustion of a specific quantity of gas in heating a definite amount of air. The unit includes a large chamber equipped with a gas burner and gas and air measuring devices, which are held to constant temperature level by being revolved in a water bath. The record is made by an electrically activated pen on a moving chart. The chamber and the recorder constitute a complete installation.

As a supplementary unit to the automatic calorimeter, the laboratory is equipped with a Junkers type water flow calorimeter which measures the heating value of individual samples of gas as distinguished from the continuous record obtained with the recording calorimeter. The Los Angeles gas companies use the Junkers mainly to get a daily check on the accuracy of the automatic calorimeter.

Recording Gravitometer

A Ranarex recording gravitometer is available to measure the specific gravity of gas, with an Acme gas density balance unit standing by for periodically checking the accuracy of the Ranarex. With the Ranarex gravitometer, the laboratory obtains a continuous record of gas passing through it, while the Acme density balance provides tests of individual samples of gas for their specific gravity. Among the facilities of the Gas Measurement laboratory is a well equipped shop for testing and repairing instruments.

Mercury Cleaning Room

A separate room has been equipped for cleaning the mercury used in the instruments. This room is laid out with a view to affording every possible precaution against the escape of mercury vapor. The retort in which the mercury is heated is operated from the outside of the room. This precludes the necessity of an attendant entering when mercury fumes are present in the room. Another feature of design is that the floors and working surfaces all slope toward catch basins.

Gas delivered from the company's main sources of supply is checked by the instruments in the measurement laboratory and by instruments at four other locations in Los Angeles —the Aliso Street, Haskell Street, Doran Street and Slauson Avenue stations—and at the station in Tehachapi, Calif. Installed where several transmission lines converge or where a single important line operates, the calorimeter charts keep a continuous record for 30 days. The charts of outlying calorimeters, however, are read every shift by the station gas dispatcher, and receive a check, also, by a laboratory representative on an average of once a week.

Portable Gas Pressure Tanks

Since the Southern California Gas Co. purchases gas from other sources of supply in amounts insufficient to warrant the installation of expensive checking instruments at the source, a different practice is employed for testing the heating value of such gas. Samples from such sources of gas are taken at frequent intervals by a company representative and delivered to the gas measurement laboratory in small portable pressure tanks. They are tested in the laboratory with the recording calorimeter in the same manner as the regular supplies.

The Gas Measurement Laboratory is directed by W. A. McGlashen under the overall supervision of Guy Corfield, head of the company's research department. The staff under McGlashen consists of four technicians, a fifth being on military leave of absence.

Valve Lubrication and Maintenance Bulletin Published

An instructive manual designed to guide users of Nordstrom Valves in the proper methods and routine of lubricating plug valves has been issued by Merco Nordstrom Valve Company. The bulletin illustrates each type of valve, revealing the operation and gives plain, specific directions how to lubricate, when, and the type of lubricant best suited for specific services. Twenty-four groups of valve parts are illustrated so that the user may select replacements. Grease gun lubrication is also discussed. The bulletin will serve as a convenient reference for servicemen, plant operators and others responsible for efficient valve operation. A copy of the bulletin, V-126, may be obtained from Merco Nordstrom Valve Company, 400 N. Lexington Avenue, Pittsburgh 8, Pa.

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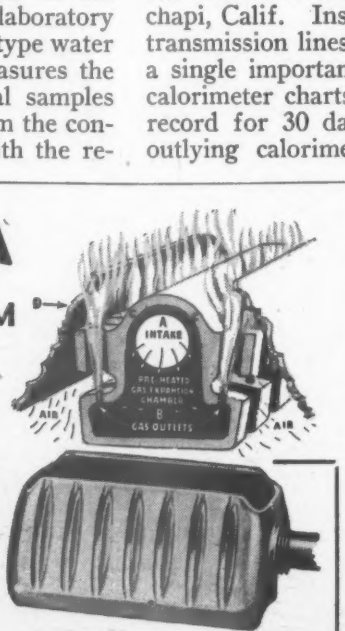

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RECENT COURT DECISIONS
Affecting Gas Utilities

Gas Law Suits Eliminated

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

Tax Law Construed Broadly

THE COURTS merely interpret the various laws, and do not in any sense make them. Realization of this fact by readers will be an outstanding element in elimination of future impractical and unprofitable law suits.

For illustration, in Liberty National Bank of Chicago v. Collins, 58 N. E. (2d) 610, reported February, 1945, it was shown that a state law imposes a tax on persons and corporations engaged in the business of distributing, furnishing or selling gas or electricity.

The owner of a large office building furnished electricity to all tenants in the premises. In rendering this service, he purchased electricity from a public utility company which he in turn sold to his tenants under the lease agreement made with such tenants. Obviously, this building owner was not a public utility and was not engaged in the business of transmitting or selling electricity to customers or persons outside of his own building.

It is interesting to observe that the higher court held that the building owner must pay the stipulated tax, saying:

"We are of the opinion that under the language used . . . appellant (building owner) by furnishing electricity to its tenants in the manner alleged in the complaint, was engaged in the busines of selling electricity for use and consumption, within the provisions of the act."

Validity of Interstate Taxation

Considerable discussion has arisen from time to time over the question whether a state may tax interstate business, and if so under what specific conditions?

First, it is well to explain that the Supreme Court of the United States has held in several decisions that a state may not impose any tax which is a direct burden upon interstate commerce. Thus state taxation on gross receipts or income of interstate business positively is void.

On the other hand, modern courts have made important distinctions between state taxation laws relating to gross receipts and net income. In other words, modern higher courts consistently hold that while state laws are void which tax gross receipts, of interstate business, yet a similar law is valid which taxes so much of the net income derived from interstate commerce as is properly apportionable to operations or business within the state.

For example, in State Tax Commission v. Memphis Natural Gas Company, 19 So. (2d) 477, reported December, 1944, it was shown that the Memphis Natural Gas Company is a Delaware Corporation. It owns certain real property in Louisiana and delivers gas to various municipalities in Mississippi. The gas is delivered through its pipe lines extending from Louisiana into Mississippi. These pipe lines are used exclusively for transporting gas interstate.

The state Legislature of Mississippi enacted a law which provides that each foreign corporation shall pay a specified tax on its *net* income derived from all property owned and from every business, trade or occupation carried on in this state.

The counsel for the gas company contended that this Mississippi taxation law was not intended to apply to foreign corporations doing an interstate business exclusively, and whose ownership of property in the state is wholly to further its interstate business. Also, it was contended that the law is void and in violation to the commerce clause of the United States Constitution, Article I, Section VIII.

The higher court refused to agree with these contentions and, held the gas corporation liable for payments of taxes on its net income derived from interstate business in Mississippi. This court said:

"The difference in effect between a tax measured by gross receipts and one measured by net income, is manifest and substantial . . . A tax upon gross receipts affects each transaction in proportion to its magnitude and irrespective of whether it is profitable or otherwise. A tax upon the net profits has not the same deterrent effect, since it does not arise at all unless a gain is shown over and above expenses and losses, and the tax cannot be heavy unless the profits are large."

Also, see State v. Gulf, 104 So. 689. This court held:

"If the tax were on gross income a serious question would here be presented, but it is not on gross, but on net, income, and a tax on net income, derived in whole or in part from interstate commerce, is not a burden thereon within the meaning of this clause of the federal Constitution."

For further variations of the law on this subject of state taxation on interstate business, see United States Supreme Court decisions, as follows: United States v. Oak Creek, 247 U. S. 321; Underwood v. Chamberlain, 254 U. S. 113; Shaffer v. Carter, 252 U. S. 37; and Atlantic v. Daughton, 262 U. S. 413.

It is quite apparent that a state may levy a general income tax upon the gains and profits of a domestic corporation, and include in the computation the net income derived from transactions in interstate commerce without contravening the commerce clause of the Constitution of the United States. Therefore, it is useless for any gas corporation to expend time, money and effort in defending or litigating suits of this nature.

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Broad Viewpoint

Modern higher courts have adopted an exceptionally broad viewpoint that all corporations, whose business transactions either directly or indirectly *affect* interstate commerce, are within the scope of interstate commerce laws and regulations.

For example, in National Labor Relations Board v. T. W. Phillips Gas & Oil Company, 141 Fed. (2d) 304, reported April, 1944, it was shown that a gas corporation has its principal office and place of business in Pennsylvania. It is engaged in the business of producing, selling and distributing natural gas and crude oil. In one year it produced natural gas of a value in excess of $3,750,000, of which approximately fifty percent was transmitted and sold to companies engaged in interstate commerce. The other fifty percent of the gas was sold for consumption within Pennsylvania to small commercial and residential consumers, primarily for heating purposes.

Litigation developed which required the higher court to decide whether this gas company was sufficiently engaged in interstate commerce business to be within the jurisdiction of the National Labor Relations Board or within the purview of the National Labor Relations Act. In holding in the affirmative the court pointed out that assuming that none of the gas went directly into interstate commerce and if none of its supplies came to it from without the state, "we should none the less be required to hold the respondent gas company to be subject to the jurisdiction of the Board."

The court explained further that if the gas company failed to deliver gas to any of the purchasers, interstate commerce would be substantially affected, and for this reason the gas company is directly affected by all laws affecting interstate commerce transactions and businesses, and therefore it is within scope of these laws.

Then, again see Pennsylvania, 40 Atl. (2d) 796, reported December, 1944. In this case a company stored coal in Pennsylvania. This coal was shipped from outside the state and was left in storage in Pennsylvania for several months while awaiting transportation by the consignee to its plants in other states. The higher court held that the state of Pennsylvania could not collect tax on this coal because it was in the course of interstate transportation. The court explained that the coal had been

shipped from another state into Pennsylvania and held that a temporary stoppage of several months in Pennsylvania did *not* take the coal from its original interstate transportation.

This is an unusually important decision because the higher courts have consistently held that stoppage of merchandise in a state for repacking, sorting and the like automatically takes the shipment from the scope of laws and regulations affecting interstate commerce shipments.

Other higher courts have held that companies transacting exclusively intrastate business are subject to laws, rules and regulations affecting interstate commerce transactions, if the companies with which the former do business transact interstate commerce business. See 63 S.C.R. 125; 63 S.C.R. 495; 181 S. W. (2d) 142; and 317 U. S. 572.

These late higher court decisions are important because the Fair Labor Standards Act, Workmen's Compensation Act, National Labor Relations Act, and other similar interstate commerce laws are involved.

Sale Contract Law

Generally speaking, a contract is void unless several elements are present as definite obligations, definite termination of the contract, definite quantity and quality of gas, etc.

Notwithstanding this usual law relating to contracts, several courts recently have rendered variable decisions.

As above explained a contract indefinite as to time ordinarily is void, because its period is perpetual. However, with respect to easements, a modern court has held that if a gas company agrees to pay a stipulated sum for use of land a contract indefinite as to time is valid.

For example, in Caruthers v. Peoples Natural Gas Company, 38 Atl. (2d) 713, reported September, 1944, the legal question presented the court was whether an easement contract, indefinite as to time, violated the rule against perpetuities, and void.

In this case it was disclosed that a gas company by a written contract was granted a right of way to lay an eight-inch pipe line for the transportation of gas. The company was further granted the right in the contract to lay, at any time, an additional line alongside of the first. In this contract the gas company agreed to pay an additional $3 per rod if the second pipe line was laid.

Later when the gas company desired to lay the second line the property owner contended that the contract was void because no definite time by limitation was specified in the contract, as to when the second line would be laid. In holding the contract valid, the higher court said:

"The present grant of a right to make use of a right of way, with a provision for payment if and when the easement is expanded, does not run counter to the rule. On the other hand, a grant subject to a condition precedent which may or may not occur within the maximum period of the rule is void."

Also, see Dockson Gas Company v. S. & W. Const. Company, 12 So. (2d) 847, where a gas company contracted to furnish to construction contractors all the butane gas for their temporary office buildings during the winter season at eight cents per gallon. It was later contended that the contract was void because neither the quantity of gas nor the period of "winter season" was specified. However, the higher court held the contract valid, saying:

"It is the duty of courts to construe agreements in accordance with the common intention of the parties, rather than to adhere to the literal meaning of the terms of the agreement."

And, also, see International Union v. Texoma, 146 Fed. Rep. (2d) 62.

In this case it was shown that a contract was made between a gas company and a union as bargaining medium for the employes. The contract provided that the contract should remain in effect from year to year until terminated by a written notice given by either party at least 30 days prior to its termination.

Letters were written by the union's secretary to the gas company stating that the union desired to negotiate an amendment to the contract. The court held that this letter did not result in the contract being automatically terminated at the end of the year, because the letter did not contain a specific notification that the contract would be terminated if the gas company refused to amend the contract.

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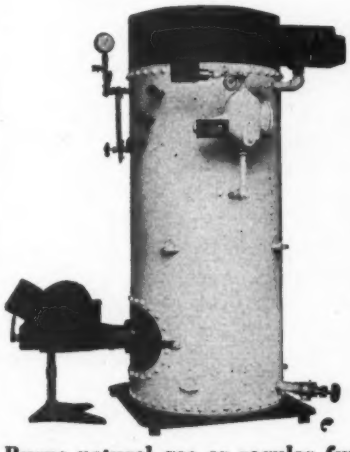

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Cornerstone Relaying Marks Reopening of Laboratories' Cleveland Offices

SPEARHEADING the gas industry's large new research program, the American Gas Association Testing Laboratories in Cleveland completely reoccupied their former quarters on April 12th, thus again centering all Cleveland operations in one place after having maintained separate temporary offices for six months after the Cleveland gas fire.

J. French Robinson, President of the American Gas Association, relaid the Laboratories' cornerstone just 17 years after the building had been erected under the chairmanship of a former East Ohio Gas Company president, R. W. Gallagher, now Chairman of the Board of the Standard Oil Company of New Jersey. The Laboratories were originally established in 1925.

Among the some 200 guests attending was Robert B. Harper, Vice-President, The Peoples Gas Light and Coke Company of Chicago, also a member of the first Laboratories' Managing Committee and for many years Chairman of the Approval Requirements Committee. George E. Whitwell, present Chairman and Vice-President in Charge of Sales of the Philadelphia Electric Company, acted as master of ceremonies.

Executives of the American Gas Association attending besides President Robinson included E. J. Boothby, First Vice-President; Major Alexander Forward, Managing Director; and George A. McDonald, Director of Publicity. Lyle C. Harvey, President, The Association of Gas Appliance and Equipment Manufacturers represented his organization. The American Society of Heating and Ventilating Engineers was represented by Professor G. L. Tuve, Chairman of its Research Committee. A number of manufacturers of gas appliances and equipment in the immediate vicinity of Cleveland likewise attended.

For nearly 20 years the Laboratories Approval Seal has distinguished gas appliances of merit. Such equipment has advanced materially the comforts of modern living until today the four big household jobs of gas—cooking, water heating, cooling and heating—have become almost completely automatic functions.

The Laboratories, dedicated in 1925 to the promotion and development of the gas industry to the end that they may serve to the fullest possible extent the best interests of the public, today stand as a symbol of American enterprise unique in the annals of business history.

The American Gas Association not only pioneered in the establishment of nationally recognized standards for appliances and their constant elevation, but by the founding of its Laboratories as an approval agency distinguished the gas industry as one of the very few in the annals of business to successfully achieve self-regulation in the interest of the public welfare.

Safety, satisfactory performance and durable construction are still the keynote of approval standards as they were in the beginning. As the result of their application in our Association's appliance testing program, today more than 95% of all gas equipment sold bears the Laboratories Approval Seal. Quality control is the watchword. In keeping with the advances of modern science, the Laboratories render a national service in determining technical soundness of construction and acceptability of performance of domestic equipment using gas fuel.

Today, research endeavors have been stepped up until they are three times the level of a few years ago. It is significant that in the last 10 years more improvement in gas-burning equipment has resulted than had taken place in the previous forty years.

Research is directed towards the constant strengthening and elevation of test procedures and the development of new basic principles and concepts. Development of single point automatic flash tube ignition for oven and broiler burners, formulation of basic gas burner design techniques, and the current investigation of kitchen ventilation represent some of the highlights of recent domestic gas research endeavors. Studies in immersion tube heating, typical of industrial research, further advancements in the mixing of gases for better and more effective utilization, and fundamental air conditioning studies which prepare the way for gas to take the lead in this rising new business all represent outstanding examples of what research has contributed to the welfare of the industry.

Experimental and research activities resulted in the development of a number of devices for the control, indication and detection of various gases as used for war purposes, particularly oxygen and helium. Attesting the unique character of this war work was the design of an automatic oxygen regulator for transport planes, a hospital plane regulator for use in transporting wounded, helium retention and purity instruments, and a number of regulators for flow control under special circumstances. Altogether a total of fourteen separate devices were developed for our country's armed forces.

Complete reoccupancy of the building, centering all operations and activities in a central quarters places the Laboratories in a position to go ahead with both their war work and their testing and research activities in an efficient manner, preparing the way for the postwar period and supporting the 52 former members now in service on the battlefields and high seas.

Pettyjohn Appointed Director Institute of Gas Technology

Comdr. Elmer Shaw Pettyjohn, U.S.N.R., was today named director of the Institute of Gas Tecnology at Illinois Institute of Technology, succeeding John I. Yellott who has held the post since September 1, 1943.

Until the time when Comdr. Pettyjohn's naval assignment is terminated, Associate Director L. J. Willien will be in charge, according to the announcement by Dr. Henry T. Heald, president of Illinois Tech and the Institute of Gas Technology.

Comdr. Pettyjohn is at present absent from the country as head of the oil section of the United States Strategic Bombing Survey and as liaison in the United States Naval Technical Mission. Extensive experience as a consultant to numerous gas companies has fitted him for the directorship of the Gas Institute.

Comdr. Pettyjohn's primary research in the field of gas engineering has concerned the production of carbureted water gas, the use of bituminous,, coking and non-coking coals and crude oil as water gas generator fuel, and evaporation and heat transfer.

Mr. Yellott left the Gas Institute on May 1 to become director of research with the Locomotive Development Committee of Baltimore, Md. A mechanical engineering graduate of Johns Hopkins University, Yellott served as director of the department of mechanical engineering at Illinois Tech for three years before taking the directorship of the Institute of Gas Technology. While at Illinois Tech he also directed the Engineering Science and Management War Training program.

Leon J. Willien, associate director, will take charge until Comdr. Pettyjohn assumes his directorship.

New peacetime load... with RUUD-MONEL

War experience has built a new public appreciation of automatic hot water.

A turn-the-faucet hot water supply is decidedly a wanted service... one that is high up on virtually every consumer-preference appliance survey.

No crystal ball is needed to predict a tremendous peacetime market... or that *GAS* holds the inside track to win it.

Such an opportunity calls for careful water heater selection. And it warrants a close, thorough study of the NEW Ruud Automatic Gas Water Heater with its *solid*, rust-free, long-lived Monel Tank.

In terms of utility and dealer sales... and in terms of public endorsement... the prewar Ruud-Monel was a brilliant success. When war took Monel from civilian use, the technical service departments of Ruud and The International Nickel Company continued their unceasing research in product improvement.

That's why your *next* Ruud-Monel will be better in many ways. In quality, for example... and in performance and appearance. Effective national advertising and promotion will also play important parts in making Ruud-Monel your peacetime load builder... and a fit selling companion of *GAS*, the Wonder Flame.

RUUD MANUFACTURING CO., PITTSBURGH 1, PA.

H_2OT STUFF

★ Seabee Herman A. Teague of Beverly Hills, Cal., took a Monel fishline to the South Pacific... but he didn't catch any fish with it.

When his comrades began losing identification tags because metal wires corroded and broke, Herman knew the ideal solution. He cut his line into short lengths, passed them around. Tags are safe now, for Monel is rustproof and highly resistant to corrosion... even in the tropics. The tags, incidentally, are themselves made of Monel.

★ The first Ruud Automatic Gas Water Heater was built in 1889. Today, Ruud equipment serves throughout the world ...in homes, and in commercial and industrial buildings... wherever hot water is needed.

★ Because Monel combines strength, toughness and corrosion resistance, this well-known metal finds many war uses. Vital parts of ships, submarines, guns and planes are made of Monel. After victory, Monel will again join with Ruud to provide the finest automatic hot water equipment you ever sold.

RUUD GAS MONEL ... perfect partners for Automatic Hot Water Service

IT'S UP TO YOU TO HELP MAKE 2=3 WITH...

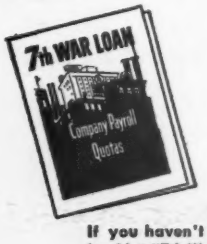
A job for seasoned executives—this 7th War Loan! Especially when we've got to make 2 war loans total just about as much as all 3 in 1944! Putting this over demands the combined and *continued* efforts of the "No. 1" men of American industry.

This means marshaling your plant drive to make every payday—from now 'til June 30th—do its share toward the success of the 7th. Directing the drive is not enough. It's equally important to check to see that your directions are being carried out—intelligently!

For example, has every employee had:

1. **an opportunity to see the new Treasury film, "Mr. and Mrs. America"?**
2. **a copy of "How To Get There," the new Finance Division booklet?**
3. **a new bond-holding envelope with explanation of its convenience?**
4. **7th War Loan posters prominently displayed in his or her department?**
5. **information on the department quota—and an urgent personal solicitation to do his or her share?**

Remember, meeting—and beating—your highest-yet 7th War Loan quota is a task calling for "No. 1" executive ability. Your full cooperation is needed to make a fine showing in the 7th! Do not hesitate to ask your local War Finance Chairman for any desired aid. It will be gladly and promptly given.



If you haven't a copy of this important booklet, "7th War Loan Company Quotas," get in touch immediately with your local War Finance Chairman.

The Treasury Department acknowledges with appreciation the publication of this message by

AMERICAN GAS JOURNAL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

Helium Handling in Texas

Underground Storage and Feature of High Pressure Transport Line

THE Bureau of Mines, of the Department of the Interior, Washington, D. C., has issued a bulletin describing the starting of the greatest single helium storage reservoir in the world in the 50,000-acre Government-owned Cliffside natural gas field in Texas where surplus helium will be piped back into the ground for conservation and future use.

Completion of a new 32-mile helium pipeline between the Exell and Amarillo, Texas, helium plants of the Bureau, together with pipeline connections to the Cliffside field near Amarillo, will permit the use of this natural underground storage place for the helium not needed now by military and Governmental agencies and not required for commercial distribution.

Although the helium piped back into the ground must be repurified later when it is withdrawn, the gas from the cache will be richer in helium content, the processing time will be reduced, and there will be immediate supplies of this valuable, lightweight gas on short notice.

Since 1923, the famed Cliffside field has produced more than 17 billion cubic feet of natural gas—more than enough to supply Washington, D. C., the Nation's capital, with gas for more than a year. Millions of cubic feet of helium have been extracted from this gas, and up until the present war the field was the chief source of the helium produced by the Bureau of Mines.

In using this vast potential storage space, the helium will be injected under pressure into one of the 11 producing wells of the Cliffside field. Practically all of the helium to be returned to the ground will come from the Excell plant, a few miles north of Amarillo, where the Bureau extracts helium from natural gas flowing to industrial and commercial plants. The amount of helium obtained depends upon the ebb and flow of gas to these plants, and it fluctuates with seasonal demands. Limited storage facilities have made it necessary to allow large quantities of this natural gas to go to market still containing helium, which was lost forever.

The Exell-Amarillo pipeline—the second of its kind constructed by the Bureau—will serve two purposes in the helium storage and conservation program, according to Dr. R. R. Sayers, Director of the Bureau of Mines. It will carry the excess helium from the Exell plant to the Cliffside well via pipeline connection near Amarillo, and it will transport helium from Exell to the Amarillo plant for loading into tank cars. In addition, the production capacity of the Amarillo plant will not be limited to gas from the original Cliffside field, but will be increased many-fold by processing the high-purity helium from the underground storage.

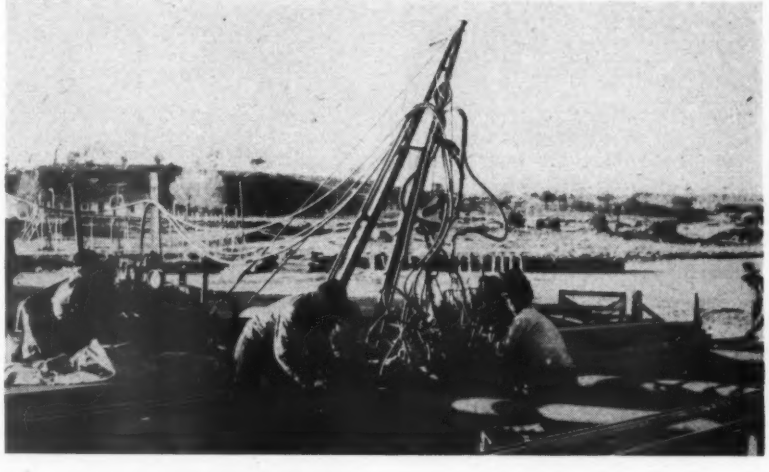
The Bureau of Mines completed the first high-pressure helium transport pipeline in March 1944, when a 90-mile line was opened between the Bureau's Navajo helium plant near Shiprock, N. Mex., and the loading terminal near Gallup, N. Mex. This line was designed primarily to facilitate the transportation of helium, and marked the first time that such a valuable gas as helium was handled in cross-country pipelines.

In constructing the 2-inch Amarillo-Exell line, several new features were embodied, among which was the relatively new method of pressure welding. In this machine process which does not require welding rods, the connecting ends of the pipe are heated to welding temperature and forced together by hydraulic pressure to form a dense and uniform weld.

By this process, virtually an unbroken 2-inch cylinder was extended for 32 miles, under rivers, through valleys, and over elevations. But before being coated and wrapped to minimize corrosion, the line was filled with natural gas and carefully examined for leaks. In checking for leaks, every inch of the line was submerged and passed through a movable water trough. By using gas for internal pressure, the slightest leak was detected when the line was placed in water.

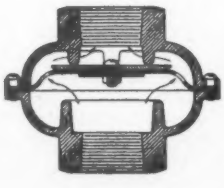
To guard against damage and loss of helium when inadvertent breaks

(Continued on page 60)

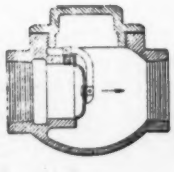


Double-jointing two inch line in yard prior to hauling to line.

Pressure Controls for Gas and Air



HORIZONTAL
DIAPHRAGM
CHECK VALVES
DISC
VERTICAL



NORWALK VALVE COMPANY

85 Spring St. South Norwalk, Conn.

Book Reviews

The 1945 edition of the Heating Ventilating Air Conditioning Guide, published by the American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York 10, N. Y. Size 6 x 9 inches, 1216 pages, price $5.00.

A 15-page detailed index, a single page quick reference table of contents, and a brief summary of chapter contents under each chapter heading provide easy reference to the subjects treated in the book.

The Guide contains 48 chapters of technical data and information grouped under the general sub-divisions, Principles; Heating and Cooling Load Calculations; Combustion and Consumption of Fuels; Steam and Hot Water Heating; Air Heating, Cooling and Conditioning; Automatic Controls, Instruments and Motors; Special Applications and Miscellaneous. A change in format has increased the amount of text per page and consequently much useful information has been added.

Among the features which add particularly to the value of the new edition are some of the following: The chapter on Panel Heating and Radiant Heating has been completely rewritten so that the first part deals with the influence of radiant heat upon the occupant and the latter part presents a new method for practical calculations of a panel heating system. An illustrative problem indicates simplifying assumptions which may be used to reduce the work required to design a satisfactory system.

Under Heat Transmission of Building Materials the use of separate columns for values of k and C will facilitate use of the tables of conductivities. Several materials have been added to the list for which heat transmission coefficients are given. A column of average annual minimum temperatures has been added to the table of Climatic Conditions in the chapter on Heating Load.

Selection of Chimneys for gas appliances will be facilitated by the chimney selection chart added to the chapter on Chimneys. In bringing the chapter on Automatic Fuel Burning Equipment up to date reference was made to the recently adopted codes for rating stokers.

The chapter on Heating Boilers has been revised to include present accepted rating practice and includes clarified definitions of the various terms referring to heating load.

New data on high pressure steam systems have been added to the chapter which now includes Steam Heating Systems and Piping rearranged to facilitate reference to various systems.

Heat transmission data in the chapter on Pipe Insulation have been revised to agree with accepted values for present typical insulating materials.

The Viscosity of Gases at High Pressures. University of Illinois Bulletin No. 354 by Edward W. Comings, Bertrand J. Mayland and Richard S. Egly. Issued Nov. 28th, 1944 by University of Illinois, Urbana, Ill. Price 75 cents.

The investigation described in this bulletin is a study of the effect of pressure on the viscosity of gases. Measurements were made on carbon dioxide, ethylene, propane, and methane, using a short capillary viscometer of the Rankine type suitably modified for work at high pressures. A critical survey of the viscosity data in the literature was made. The most reliable of these, together with the data obtained in this investigation, were used to construct a general correlation based on the principle of corresponding states. This correlation can be used to predict the viscosity of a gas at any temperature at an elevated pressure if the critical temperature, the critical pressure, and the viscosity at the same temperature and at a pressure sufficiently low so that the viscosity is independent of the pressure are available.

THE RECONVERSION QUARTETS

"OHM, OHM ON THE RANGE WHERE THE VOLTS AND THE KILOWATTS PLAY---"
"NOW I SMILE ALL THE WHILE WITH 'NEW FREEDOM' IN THE HOME DON'T FENCE ME IN ---

Keen competition for post-war business in appliances for the domestic market is already smoldering. The gas industry has analyzed its field from many angles and in many localities. Some preliminary announcements have been broadcast. Many others will follow as reconversion proceeds.

In tune with these activities, competitive songsters, in lusty and stentorian antiphonal cadences, acclaim and display their dominant ranges.

On the left the mentors of resistance as a source of heat, chant classic hits in harmony such as:

Ohm, Ohm on the Range,
Where the Volts and the Kilowatts play,
With seldom a hitch
In control or in switch,
And the coils uncorroded all day.

Overwhelming all competitive effort, the Blue Flame Boys on the right vocalize in unison,—without secondary air,—their paean of popularity and triumph:

Now I smile all the while
With 'New Freedom' in the home,—
Don't fence me in:
For I choose B.T.U.'s
To attain the wonder flame,—
Don't fence me in . . . .

News of the Gas Industry

Court Upholds F.P.C. On Pipe Line to Memphis

The United States Fifth Circuit Court of Appeals at New Orleans cleared the way for resumption of construction of additions to the natural gas pipeline serving Memphis, Tenn. The State of Louisiana had obtained an injunction from the court last Fall, which halted construction.

The law in the case turned on whether the State of Louisiana could override the Federal Power Commission approval for expansion of the line between Monroe, La., and Memphis by taking the case out of FPC proceedings into Federal Court.

Justice Joseph C. Hutcheson wrote the opinion for the three-man court in which it was held that Louisiana had not met the requirements of the Natural Gas Act in showing that the case should be transferred to the courts.

Public Necessity Cited

The opinion added that the court found "that the record amply supports the commission's finding both that there was a public need to be served and that the applicant for the certificates (the gas company) showed itself adequately equipped to perform it."

Of the Louisiana group's contention that the order should be set aside because the Memphis firm was distributing the fuel "to be burned under boilers," the opinion added:

"The main contention, that the order is invalid and the certificates may not stand because issued for a wasteful use of gas, is, we think, no better taken . . ."

A.G.A. Committee on National Advertising

Two changes in the personnel of the Committee on National Advertising of the American Gas Association are announced by H. Carl Wolf, President, Atlanta Gas Light Company, and Chairman of the Committee:

C. S. Stackpole, Manager-Merchandising, Domestic Gas and Electric Sales, Consolidated Gas Electric Light & Power Co., Baltimore, Md., will represent participating companies in Maryland, District of Columbia, Virginia and Kentucky. He replaces Marcy L. Sperry, President, Washington Gas Light Co., Washington, D. C., who has been a member of the Committee since the inception of the national advertising program nine years ago.

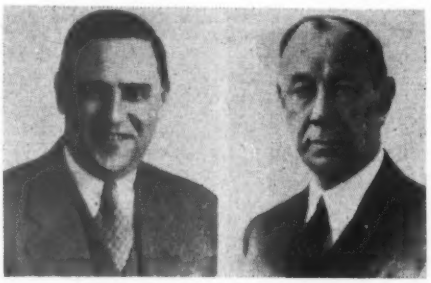
H. S. Christman, General Sales Manager, The Philadelphia Gas Works Co., Philadelphia, Pa., replaces Fred B. Hofft, V. P., The United Gas Improvement Co., Philadelphia. Mr. Christman represents companies situated in Eastern Pennsylvania and Delaware.

Mr. Stackpole and Mr. Christman were elected to the Committee by vote of participating companies in their respective territories.

The Philadelphia Gas Works Co. Elects Two Vice Presidents

Hudson W. Reed, the President of The Philadelphia Gas Works Company, announces that two members of his Staff have been elected Vice Presidents of the Company.

Thomas S. Lever, Jr., was elected Vice President in Charge of Accounting. Mr. Lever was born in Philadelphia and entered the employ of The United Gas Improvement Company, then operating the City's Gas Works, as a Junior Clerk in February 1903. On May 1, 1933 he was appointed Controller of The Philadelphia Gas Works Company.



Thomas S. Lever, Jr. H. Bruce Andersen

H. Bruce Andersen, who has charge of the distribution system of the Company, was elected Vice President in Charge of Distribution. Mr. Andersen was born in March, 1885 in Philadelphia. He attended Episcopal Academy from which he graduated in 1902, and then the University of Pennsylvania from which he graduated in 1906 as a Mechanical Engineer. He entered the Company's employ in July 1906 as Street Clerk and has been with the Gas Works ever since.

Both Mr. Lever and Mr. Andersen are active members of the Pennsylvania Gas Association and of the American Gas Association.

Power Generation From Oklahoma Fuels

Oklahoma Gas & Electric Co. electric energy output for 1944 was 1,126,000,000 k.w.h., all generated by Company-owned plants using Oklahoma fuels as follows:

Coal	3625 cars
Petroleum Coke	304 cars
Oil	51,000 barrels
Gas	13,214,000,000 cu. ft.

The combined fuel bill was but 10% of the Company's total expense and only one third of its 1944 tax bill.

Johnstown Pa. to Be Served by Peoples Natural Gas Co.

As the outgrowth of a deal in which final papers were signed April 6th, the Peoples Natural Gas Company, Pittsburgh, Pa., will take over from the Pennsylvania Electric Company the sale and distribution of natural gas to 18,500 users in Johnstown and vicinity.

Penelec disposed of its franchise and physical properties—gas mains and other facilities—to the Pittsburgh firm for a consideration approximating $1,200,000, according to an announcement by President Philip H. Harris and President Edward M. Borger of Peoples.

June 30 is stipulated as the date on which the transfer of interests becomes effective. While Peoples negotiates such details as establishment of a commercial office here and coordination of operating and maintenance personnel on transfer from Penelec, billings will be made by Penelec and all collections and customer contacts will be handled at Penelec's office. Penelec's withdrawal as applying to billing and other details will be completed within 60 days of the June 30 closing date.

The sale will be a cash transaction, it was disclosed. Both parties will shortly file notice with the Pennsylvania Public Utility Commission and the Securities and Exchange Commission of Penelec's withdrawal as a gas supplier here.

Colin U. Miller will be retained by Peoples as superintendent, a post he filled in Penelec's gas department. Penelec employees in the gas department likewise, numbering about 37, will be offered similar employment by Peoples with the exceptions that Penelec will retain portions of the meter-reading group and maintenance and service personnel who work jointly in the gas and steam heating departments.

Penelec has furnished natural gas, purchased from The Peoples Natural Gas Company and piped from wells in Western Pennsylvania and West Virginia, to consumers in Johnstown, Dale, Westmont, Southmont, Lorain and Ferndale. Peoples has been supplying the gas requirements of Penelec and its predecessors since 1907.

Peoples, a subsidiary of the Consolidated Natural Gas Company, a Delaware concern, has been operating since 1885 and today is one of three principal suppliers of gas in Pittsburgh. Peoples distribution domain also includes Altoona, Greensburg, Latrobe, Aliquippa and Kittanning, embracing many larger industrial users.

Officers of the Peoples company are Edward M. Borger, President; J. J. Jacob, Jr., and S. C. Preston, Vice-Presidents; J. B. Sayers, Secretary, and H. D. Borger, Treasurer.

Customer Acceptance of Gas Heating Opens Vast Market

In the April issue of "The Philadelphia Gas Works News," H. S. Christman, Sales Manager, states: "Few people would have realized several years ago that we would reach a point where we would have to ration new users of gas heating. This is the situation today, and we are embarrassed by the great number of peoples who are clamoring for gas heat. This may be hard for those to believe who remember the great sales effort expended in the past to obtain each new heating installation and to retain those we already had. It is most remarkable that our gas heating installations have increased by over 14,000 jobs in the past five years.

"The year 1940 marked the turning point in public acceptance of gas heating. It was in December, 1939, that the present heating rate became effective, and immediately sales increased. The change in rate was designed to make gas available for heating small, row-type Philadelphia homes, of which there are about 300,000, at a heating cost of about $100 a year. This is probably the largest metropolitan market for home heating with manufactured gas in the United States, and it has been in these small homes that gas has been so widely sold.

"The war brought about many controls of business by the Federal Government: The Manufactured Gas Industry, in September, 1942, was forbidden to take on any additional house heating customers. That continued until March, 1944, when the limitation order was relaxed to permit installations for people who required automatic heat because of their health, or whose heating equipment was broken beyond repair. Under that program, there were quite a number of installations made for those who could qualify.

"Then, in September of last year, our Company was relieved of all restrictions on heating sales, since we had the plant capacity available to supply a reasonable number of additional heating installations. Within a month, 1,500 orders for gas heating equipment were taken by the many selling agencies in the city, so that the Company was swamped with requests to set larger meters. On October 18th, a letter was sent to all selling outlets, advising them that no more new orders could be accepted for the balance of the year.

"Last December the program for 1945 gas heating sales was announced. When the sales made in 1944 were installed we would have approximately 19,000 installations. We were authorized to take an additional 2,000 jobs this year, with meter setting scheduled during the spring and summer months, so that the whole program would be finished by next September. . . .

"From talking with customers, it is the general consensus that the present interest and enthusiasm for gas heating will extend into the future. One of the reasons is that there are now 19,000 satisfied users of gas for heating, and that there will be an increase to 21,000 by summer. These people are influencing their friends and neighbors to 'swing to gas.'

"Another reason for the popularity of gas arises from the fact that people generally have learned that there are other considerations of vital importance in selecting a heating fuel, over and above the dollars and cents 'cost' of the product. Dependability of supply, cleanliness in operation, freedom from service troubles and no extra costs; these worthwhile factors are appreciated more and more by those desiring a completely modern automatic heating system."

* * *

Mr. Christman represents gas companies situated in Eastern Pennsylvania and Delaware on the Committee on National Advertising of the American Gas Association.

Independent Natural Gas Assn. to Participate at F.P.C. Investigation

The Independent Natural Gas Association of America has decided to participate in the Natural Gas Investigation by the Federal Power Commission.

The Board of Directors, after reviewing the situation in an all-day meeting in Tulsa, unanimously voted to take part in the inquiry and directed the Executive Committee to work out details of the Association's participation in the hearings.

E. Buddrus, Association President, wired Basil Manly, FPC Chairman, of the decision and requested a conference between the Executive Committee and FPC at an early date.

The Executive Committee was directed to employ legal and engineering staffs necessary for properly presenting the industry's case.

Utility Truck and Auto Operations in Pittsburgh District Record Extremely Low Accident Rate

Four hundred and fifty trucks and automobiles operated by the Pittsburgh group of public utility companies within the Columbia Gas & Electric Corp., travelled 5,354,621 miles during 1944 and were involved in only 45 accidents.

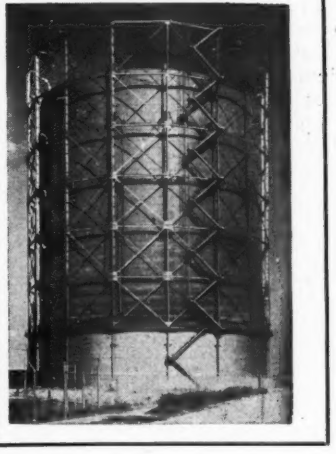
W. H. Adams, safety director of the Pittsburgh group made this announcement recently. Mr. Adams said that this was the lowest accident record in nearly 20 years of safety activity within the group which comprises the Manufacturers Light & Heat Co., the Natural Gas Co. of West Virginia, the Cumberland & Allegheny Gas Co. and the Gettysburg Gas Corporation.

This public utility fleet is composed of 355 trucks and 95 passenger cars. The emphasis placed on the safe driving of these vehicles during 1944 resulted in the low accident frequency rate of .84 accidents for each 100,000 miles of travel.

Under the direction of Mr. Adams, group safety meetings of supervisors and employes are conducted frequently throughout Pennsylvania, West Virginia, Ohio and Maryland. Frank discussions are held pertaining to driving hazards and corrective measures which might be taken to eliminate or reduce the possibility of accidents. The utility employes are encouraged to offer safe driving suggestions. Their ideas are presented at supervisory personnel meetings for investigation and possible adoption.

The automotive transportation safety record within the Pittsburgh group of companies is maintained on a monthly basis. All production, transmission and distribution districts and divisions are regularly advised of their standing in the competition.

STACEY
SINCE 1851



94 YEARS of leadership in our service to the gas industry, and more recently serving also the Government and its armed Forces with many important installations, is a record of which we are justly proud.

The gas plant equipment we design, fabricate and erect includes

Low Pressure Gas Holders of simple and sturdy design with high quality workmanship.

High Pressure Holders, either vertical or horizontal type, riveted or welded, correct in design and detail, for storage in outlying districts, peakloads and emergency demands.

Ask us about our Gas Holder Inspection Service.

THE STACEY
Manufacturing Co.
ENGINEERS
FABRICATORS
CONSTRUCTORS
Cincinnati, Ohio

Cooperative Advertising in 1945 of Pacific Coast Gas Assn.

Take five salient selling messages, sugar-coat them with a little fantasy, and you have the formula of the Pacific Coast Gas Association's regional cooperative advertising for 1945, 17th consecutive year of cooperative promotion by a group of western utilities.

All advertising directed to home consumers feature the "Flame Family": five animated gas-flame "elves" or "good gremlins" who portray the five major advantages of gas fuel. The fast action of gas is exemplified by *"Speedy"*; its cleanliness, by *"Cleany."* Dependability is *"Steady"* who, to quote one of the ads, "is always there when you want him and never lets you down." Flexibility has been shortened to *"Flexy"*; and, finally, *"Thrifty"* reminds readers that gas rates are low and gas appliances save money in many ways.

These gas-flame quints are appearing monthly in full-page space, with color, in Sunset Magazine, California Parent-Teacher and California Federation News. Black-and-white versions of the same ads are appearing in Parent-Teacher Courier and Parent-Teacher Journal.

As the current series progresses, each of the quints will be featured in one advertisement, but with the other four always pictured, too. Busy little helpers, they are shown aiding the family to enjoy easier housekeeping and carefree comfort.

In addition to the consumer advertising, the P.C.G.A. is also publishing a full schedule of trade journal advertising, using mostly full-page or one-half-page space in industrial publications, with special copy for each classification indicated. The fields covered include:

Appliance Dealers, Building Inspectors, Architects and Builders, Commercial Cooking, Commercial Baking, Factories and Shops.

Industrial and commercial copy stresses improved methods of gas utilization and features western installations whenever possible. A chart showing the actual increase in commercial-industrial meters during the last ten years is included in industrial subjects.

The Association's cooperative advertising is guided by a committee consisting of advertising and sales officials of participating companies, assisted by Clifford Johnstone, who has been managing director of the Association for many years. Contributing companies and their representatives on the Advertising Committee are:

Coast Counties Gas and Electric Company, R. L. Hayden; Pacific Gas and Electric Company, R. R. Gross (chairman); San Diego Gas and Electric Company, F. M. Raymond; Southern California Gas Company, Hamilton Knott; Southern Counties Gas Company, C. H. Potter.

James C. Knollin, head of Knollin Advertising Agency, San Francisco and Los Angeles, who has served the Association for the past sixteen years, continues handling the campaign under the direction of the Advertising Committee.

Your Gas Company
PRESENTS
THE FLAME FAMILY
Five happy helpers
To make your housework light;
Asking little in return—
Working day and night.
I'M SPEEDY
Just turn a valve and there I am ...quick as a flash. I give you full heat instantly, faster than any other fuel. That's a fact.
I'M CLEANY
I save you work and cleaning bills. No smoke, soot or grime when I'm on the job. Gas is delivered clean, burns clean.
I'M STEADY
Always there when you want me, I never quit. I help you get meals on time, keep hot water always on tap. Yes, gas is the dependable fuel.
I'M FLEXY
That's short for "flexible". I bend to your will. I give you low heat, high heat, any heat between. Your slightest wish is my command.
I'M THRIFTY
I see that you get more for your money, and help you save. Gas is the economy fuel. Gas rates have gone down as living costs went up.
THE WEST PREFERS GAS
QUICK • CLEAN • DEPENDABLE
FLEXIBLE • ECONOMICAL

This is the first of a series of full page advertisements in consumer magazines. The "quints" of the Flame Family tell their story monthly to nearly a million readers in the Pacific Coast area. The message is also carried through space in the business papers including those of cooperating dealers. The series prepared by Knollin Advertising Agency.

Chattanooga Gas Co. Asked to Reduce Rates

The state railroad and public utilities commission of Tenn., has opened negotiations with the Chattanooga Gas Company for a reduction of its rates.

The state commission opened negotiations with the Chattanooga utility after seeing from its balance sheet that it had netted 10 per cent earnings on its invested capital during the last reporting period. The authorized earning limit for utility concerns is 6 per cent.

The Chattanooga Gas Company recently submitted a report showing the character of its receipts. It was understood that the company has not agreed to reduce its rates and maintains that the excess earnings over the 6 per cent margin allowed by law has resulted from "temporary war contracts." Several of the concerns which have swelled the gas company's receipts have war contracts, the company maintains. When the war ends the receipts will recede below the excess figure, the company further maintained.

Propane Augments Gas Supply at Asheville, N. C.

Installation of equipment for producing propane gas in sufficient quantities to augment the gas supply of Asheville, N. C., by 25 per cent has just been completed by the Asheville Gas Company.

The new installation will make the city virtually independent of a gas shortage such as occurred last winter and caused the company to appeal to consumers to curtail the use of gas.

Honeywell Announces School for All Phases of Heating Industry

On April 11th, in New York, the Minneapolis-Honeywell Regulator Co. gave a preview of an educational program, which they have undertaken, in the heating industry. The "school" will be open to dealers, wholesalers, manufacturers, vocational schools, electricians, steamfitters, sheet metal workers and any others interested in heating, Arnold Michelson, vice president, said in announcing the course at a press conference held in conjunction with a meeting at which the program was announced to Honeywell employees. There will be no charge of any kind for those attending.

In planning the course, the company also had in mind the rehabilitation of men of the armed forces who, by prior experience, or by choice, want to find jobs in some phase of the heating industry.

The courses will start May first, and will be held in all sections of the United States where company branches are maintained, and when a sufficient number of people indicate a desire to enroll. Prepared by Honeywell technicians in cooperation with a company specializing in visual education, the complete course extends for four 2½ hour meetings. More than 800 slides, many of them in color, are used, while simple but complete lectures fill in the details. The schools will be conducted by company sales-engineers who have been specially trained for the purpose.

Primary purpose of the program is to teach the application of automatic controls and their installation and maintenance in connection with all types of heating systems using all kinds of fuel. The information to be covered has been divided into nineteen subjects with plans to cover several phases in each meeting. Subjects to be discussed are: control identification, circuits, thermostats, thermostat installation, limit controls, relays, controls for oil burners, summer-winter systems, oil burner systems, gas burner control systems, stoker systems, hand-fired systems, unit heater systems, zone controls, Weatherstat systems, Moduflow, and installation helps and service tips.

"We also believe" Mr. Michelson said, "that with trained help, the heating industry will assume a new importance in the nation's economy and will provide more jobs at higher incomes for more people than ever before. Certainly the opportunity is there, and we hope this school will help every member of every branch of the industry to attain it."

Enrollment cards for the courses are available from wholesalers, utilities, manufacturers, trade and vocational schools and other organizations in the industry.

Animated Album Tells Estate Postwar Story

The sales training department of The Estate Stove Company, Hamilton, Ohio, has recently placed in the hands of all of the company's wholesale distributors a graphic presentation, or "visualizer," which embodies several unique features. A limited number of the presentations are now being placed with distributors for the use of their salesmen in franchising dealers for postwar distribution of Estate Heatrola Ranges and Heaters. Later, it is planned to make separate sections of the presentation available to dealers for their use in telling the product story to consumers.

The first section of the presentation, which is put up in a standard three-ring binder, is an institutional story based on the theme of, "Who Did It—First?" This part of the presentation consists of cartoon sketches and hand-lettered captions in rapid-fire question-and-answer style.

Then follows a brief review of Estate war work activities, and this leads naturally into a look ahead and a suggested program for postwar merchandising of Estate Heatrola cooking and heating appliances.

The following sections of the album then tell the product story, dealing specifically with each of the company's major lines—gas ranges, electric ranges, coal heaters, oil heaters. In each of these presentations an effect of animation is secured by the ingenious employment of slides, dials and folding flaps.

On a page which shows a large photograph of a girl standing in front of the range and pointing to the door of the Bar-B-Kewer, flaps drop down to show, successively, the interior of the Bar-B-Kewer compartment with the broiler pan in place, a turkey in the Bar-B-Kewer pan, two chickens in the pan, etc.

The final section of the book is a prospectus of Estate's 1945 national advertising program.

Antrim Rejoins Bryant

Major William D. Antrim has returned to the Bryant Heater Company after nearly two years of service with the United States Army Ordnance Department as a supervising research and development expert on artillery ammunition, according to announcement by Lyle C. Harvey, president.

Mr. Antrim will devote his time exclusively to the adaptation of the new Bryant automatic safety pilot to gas range ovens and broilers.

A native of Philadelphia, Mr. Antrim attended Drexel Institute and, prior to his military service, was engaged in research and development on controls for the Bryant Heater Company. Previously, he was associated for 17 years with the Roberts and Mander Stove Company as chief engineer.

A prominent member of the American Gas Association Approval Requirement Committee On Domestic Gas Ranges And Hotel And Restaurant Ranges, Mr. Antrim is an outstanding authority in gas range design and control. He was active in many pioneering developments in the field, especially in the adaptation of single point flash tube ignition to gas ranges.

David Gordon Joins Foster D. Snell, Inc.

David Gordon, recently Chief Engineer for the Interchemical Corporation, has joined the staff of Foster D. Snell, Inc. of Brooklyn, N. Y., as Director of Engineering.

Mr. Gordon formerly was in charge of project engineering with the M. W. Kellogg Company. His duties extended from initial sales and contract discussions through processing, job engineering and construction to attainment of operating guarantees.

With the Interchemical Corporation, as Chief Engineer, his work has involved technical advice on matters relating to selection of plant sites, building construction and development of research laboratory processes through the pilot plant stage into proposed full scale operations.

"JOURNAL" GAS FLOW COMPUTERS

High Pressure

RANGE:

Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe—Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in., 1-500
Sum of Absolute Pressures—Lbs. per sq. in., 2000-20
Specific Gravity—1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure

RANGE:

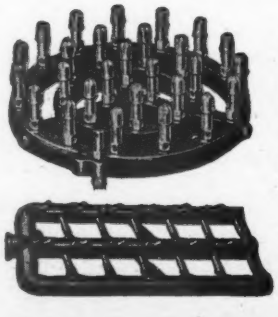
Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter—¾" to 48" (including standard and actual weight up to 4")
Pressure Loss—Inches .01-10
Length of Pipe—Feet 30-30,000
Specific Gravity—1.5-.35
Constants—1400-1000

Made of durable celluloid, encased in a convenient leatherette cover with complete instructions. Actual size 6¼ x 7½

3.50 Each Postpaid

American Gas Journal
53 Park Place, New York 17

BARBER BURNERS
For All Gas Appliances



We have the facilities and experience for designing and building the exact type and size of burner unit to fit any gas appliance, using natural, manufactured, Butane or bottled gas. We cooperate with any reliable manufacturer in the necessary development and laboratory testing, and in acting as continuous source of supply for his burner units.

Latest Catalog on request.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, O.

New Catalog Issued by Nordstrom

A completely new, revised catalog has just been issued by Merco Nordstrom Valve Company. It makes obsolete all previous editions of Nordstrom Valve catalogs and valve bulletins. Comprised of 134 pages of valve listings and specifications, engineering tables, lubricant data, etc., it presents the latest information regarding the entire line of Nordstrom Valves.

Numerous revisions were made in the specification tables. Certain sizes and types, which previously overlapped other sizes, have been eliminated so that the new catalog presents a more streamlined arrangement of valves in keeping with the government's desire to avoid duplication of products and to provide greater simplification in cataloging.

Many new and useful engineering tables have been added. Parts for the various types of valves are illustrated; also detailed drawings clearly depicting the features of construction. The latest listing of Nordco lubricants includes several new numbers.

A copy of the catalog, No. 9, may be obtained by valve users from Merco Nordstrom Valve Company, 400 N. Lexington Avenue, Pittsburgh 8, Pa.

Rohde Rejoins Ruud Manufacturing Co.

G. M. Rohde, Jr., has rejoined the Ruud Manufacturing Company, makers of automatic gas water heaters, Pittsburgh, Pa., as assistant to the president, R. H. Lewis, and will be in charge of special assignments.

Mr. Rohde was at one time with the Pennsylvania Power & Light Company as supervisor of gas sales and of the electric range and water heater department. Later he was western manager for Roberts & Mander and following that a member of the Ruud-Monel promotion staff. When war came, he was loaned to the Training Within Industry of the War Manpower Commission and subsequently became associated with the Westinghouse Electric & Manufacturing Company as manager of rural electrification at the Pittsburgh, Pa., headquarters.

Val Link of American Meter Co. Transferred to Dallas

After eight years as Sales Engineer at the Shreveport office of Westcott and Greis, division of American Meter Company, Val Link is now serving in the same capacity at that company's Dallas branch.

Val Link

A graduate of St. Mary's College, at San Antonio, Mr. Link began his career with the United Gas System. When he left that organization in 1937 he was in charge of the Measurement Department of the Laredo-Bruni District.

In addition to his engineering background and years of practical experience, his excellent knowledge of Spanish has enabled him to be of special service to companies operating in Mexico.

L. O. Secord Edits Pittsburgh Appliance Publication

Lawrence O. Secord has been appointed editor of Gas Appliance Dealer, monthly publication of the Gas Appliance Promotion Division of Ketchum, MacLeod and Grove, Inc., Pittsburgh advertising agency, it is announced by Emil Hofsoos, vice president. A native of Canada where he served his apprenticeship in printing, Mr. Secord formerly was a district representative for Alco-Gravure, Division of Publication Corporation.

The Gas Appliance Promotion Division is operated for the three Pittsburgh gas companies in the promotion of independent dealer cooperation for the sale of quality gas appliances throughout western Pennsylvania.

Dresser Plans for Post-war Service to Customers

What's going to happen to the orders you place when the war ends? Suggestions on how to avoid the confusion and difficulties resulting from a concerted effort to replenish depleted inventories is the subject of a folder issued recently by Dresser Manufacturing Division of Bradford, Pa., one of the Dresser Industries, to its several thousand customers in the gas, water, oil and industrial fields.

One of the big problems of reconversion will be the buying rush created by the desire to bring present low war-time inventories back to normal on many items. How can this be handled with the least amount of dislocation to suppliers and with greatest fairness to all customers?

Many firms are now accepting orders for post-war delivery on the basis of "first come—first served." Dresser, which manufactures a complete line of mechanical pipe couplings, fittings, repair clamps and sleeves, would prefer to have all of its customers supplied with all of its products when they are needed. If those who buy first take more than they need, large, unnecessary stocks will be created.

Dresser suggests the present placement of non-priority memorandum orders to cover 12 months needs following the lifting of stock restrictions, with an indication of the quantity needed quarterly. These orders will then be studied and deliveries planned, bearing in mind the needs of all customers rather than favoring the first few who have placed orders.

With the non-priority orders on file, customers' requirements can be kept in mind should there be an opportunity to make some material on a non-priority basis prior to the war's end. However, no shipments would be made on any items without first requesting a formal order at the then prevailing prices. How Dresser believes this plan will work to the advantage of everyone is told in the folder which may be had by writing directly to Dresser Manufacturing Division, Bradford, Pa.

COMPLETE GAS PLANTS
●
INDUSTRIAL FURNACES
●
THE GAS MACHINERY CO.
16100 Waterloo Road
Cleveland 10, Ohio

CONNELLY IRON SPONGE

High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . . there is no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
ELIZABETH, N. J. LOS ANGELES, CALIF.
3154 SOUTH CALIFORNIA AVE., CHICAGO 8, ILL.

Home Planning Bureaus to Guide Public Is Postwar Aim For Country's Gas Companies

The gas utility companies throughout the country are being encouraged to establish home-planning bureaus to stimulate good planning on postwar home building and remodeling, according to Surface Combustion Corp., Toledo, Ohio, which has prepared detailed plans for the utilities to use in organizing and operating such bureaus.

The company has incorporated the working plans for a home-planning bureau in a book which emphasizes the importance of gas company co-operation with the heating dealers, architects, builders, lumber and supply companies, mortgage institutions and department stores in the community.

Setting up, energetically conducting and publicizing a central clearing house on building information and displays for prospective home builders are in the "Janitrol" "Quick-Getaway" plan for the utilities when building and peacetime manufacturing restrictions are lifted.

One of the most important pieces of material furnished for general distribution is "Let's Plan A Peacetime Home," an interesting and practical book covering every phase of home planning for the owner

The housing bureau plans may be modified or amplified by the local gas company, Surface Combustion pointed out. Steps for organizing and operating a bureau are made available at this time so that the utilities may be fully prepared to establish one by this fall, or sooner if necessary.

L. T. Potter in New Post

L. T. Potter has been named assistant general superintendent of Lone Star Gas Company and Lone Star Producing Company, according to announcement by Julian L. Foster, general superintendent and chief engineer for the companies. Mr. Potter will also continue with his duties as superintendent of production. The new appointment was effective March 3.

In 1931 he was appointed assistant production engineer. He was made chief production engineer in January, 1939, and production superintendent in June, 1941.

Public Service Corp. Elects Officers

Directors of Public Service Corp. of New Jersey and subsidiary companies elected April 17th, George H. Blake, president to succeed Edmund W. Wakelee, president since 1939, whose retirement because of illness was announced.

Mr. Blake, who has been with the corporation since 1910, has been executive vice-president since 1943.

Thomas N. McCarter Jr., was elected to succeed Mr. Blake as executive vice-president. Mr. McCarter had been vice-president in charge of Public Service's southern division for the last six years.

Thomas N. McCarter Sr., long a leader in Public Service, was re-elected chairman of the board and Percy S. Young was re-elected chairman of the executive committee.

The directors re-elected or re-appointed all other executive officers of the corporation and subsidiary companies.

Succeeding John A. Clark, who retired recently, Frederick A. Lydecker, was elected vice-president in charge of gas operations of Public Service Electric & Gas Co. and a director of the corporation's subsidiary companies. He had been assistant vice-president in charge of gas operations.

Register of the Gas Industry British 1945 Edition

This annual publication 8½"x11" bound in stiff cover appears in its usual form. It comprises the following:—Directory of gas undertakings in England and Wales, Scotland and Ireland; a Technical Section with index and a directory of manufacturers. Included is an alphabetical index to the names of officials.

There is a generous representation of advertisers of equipment, appliances and services.

Pipe and Clamps for High Pressure. A report on physical tests of Inner-Tite cast iron pipe and materials with catalog addenda is covered in a 16 page bulletin issued by the Inner-Tite Division of Yara Engineering Corporation, Elizabeth, N. J. Following the seven tests illustrated and described are details of dimensions and weights of 4 inch to 24 inch pipe, valves, fittings and bell clamps, the latter in sizes up to 36 inches.

GLOVER-WEST

CARBONIZING SYSTEMS

• *boost* production

• *cut* fuel costs

440 CARBONIZING PLANTS, in 20 countries, testify to the outstanding advantages of GLOVER-WEST Systems.

Today, with the fate of civilization depending on the speed and efficiency of our war-output, these advantages cannot be overstressed:

GLOVER-WEST CARBONIZING SYSTEMS

- ***LOWER*** Fuel Consumption and Maintenance
- ***FACILITATE*** Operation
- ***PRODUCE*** dryer, cooler Coke
- ***REQUIRE*** less Ground Area
- ***INSURE*** greater Flexibility

WEST GAS IMPROVEMENT CO.
424 Madison Ave., New York, N. Y.

GPM
IRON HYDROXIDE

The mark of
unerring dependability
in purification

GAS PURIFYING MATERIALS CO., INC.
3-15 26th Ave.
Long Island City 2, New York

GAS PLANT EQUIPMENT

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PIPE LINE CONSTRUCTION

THE U.G.I. CONTRACTING COMPANY
A DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS INC
NEW YORK PHILADELPHIA CHICAGO
MAXIMUM RETURN TO CUSTOMER PER DOLLAR EXPENDED

FRANKLIN H. NICKERSON

Franklin H. Nickerson, retired vice-president and trustee of the Consolidated Edison Company of New York, died March 30th at his home in Redding, Connecticut.

Mr. Nickerson retired on September 11, 1944, his sixty-fifth birthday, since regulations of the Consolidated Edison System Companies provide for retirement at that age. His business career was of the "telephone and mail clerk to vice-president" type.

All except three of Mr. Nickerson's forty-seven years of service with the Edison System Companies were spent in accounting, statistical and financial work. He was made vice-president in charge of finance and statistics of the Consolidated Gas Company in 1929. Since the 1936 mergers which brought about the present corporate set-up until his retirement, he was vice-president of Consolidated Edison Company responsible for regulatory, statistical, tax and related matters.

He had been a trustee of the Consolidated Edison Company of New York since 1936. He was also a director of the Brooklyn Edison Company, New York and Queens Electric Light and Power Company, New York Steam Corporation, and Westchester Lighting Company. He was a director of many of the gas and electric companies which were merged into Consolidated Edison Company of New York in 1935 and 1936.

S. A. MACDONALD

S. A. "Sandy" Macdonald, Portland (Ore.) Gas & Coke Company appliance dealer coordinator for seven years and a veteran of both world wars, died suddenly at his home March 18.

He had received an honorable discharge from the navy only last January, returning to the position he held at the time of his enlistment in November, 1942. Apparently in good health, he had worked as usual the Saturday morning before he was stricken.

In the present war he was a specialist 1st class in navy recruiting, but had yearned for sea duty which he saw in the last war as boatswain's mate aboard the U. S. S. Princeton. He was a member of Navy post, No. 101, American Legion.

He was well known in the gas industry, especially in the Pacific Northwest. His enthusiasm, sincerity and sense of humor were as much in evidence at meetings of the industry as they were in his daily work where he made a host of friends for both his Company and himself.

CHARLES B. NASH

Charles B. Nash, Director of Publicity of American Radiator & Standard Sanitary Corporation, died on April 17th.

In May, 1903, he started his advertising career by entering the employ of the then Standard Sanitary Mfg. Co., Pittsburgh. In June, 1903, he was made Assistant Advertising Manager, and in March, 1913, became Advertising Manager. In June, 1930, he was appointed Vice President, Director of Publicity. In 1939, when the Standard Sanitary Mfg. Co., was consolidated with others into the present American Radiator & Standard Sanitary Corporation, he headed the advertising and publicity of the new corporation.

Mr. Nash was well known in the plumbing and heating industry, and will also be remembered for his column of personal reminiscences "Along the Trail." He had a great many friends among association officials and members.

Surface Combustion N. Y. Offices

All New York City offices of Surface Combustion Corp., with headquarters at Toledo, Ohio, have been consolidated at 315 Transportation Building, 225 Broadway, New York 7, the company announces.

The move, effective May 1, makes possible one centralized location for all divisions including the Janitrol gas-fired space heating division. The personnel and operations of each division continue unchanged.

Catalogs

Gas Burner Tips. Bulletin No. 444, recently published by the American Lava Corporation, includes data on burner tips. AlSiMag Ceramic insulator bodies, each with its particular physical and electrical characteristics, are concisely described and the uses indicated.

Typical designs taken from a roster of more than 25,000 distinct items are splendidly illustrated. Property charts and other technical data, together with practical information on manufacturing processes, are included.

Aluminum Industrial Ladders—A bulletin describing Industrial ladders in all-aluminum tubular rail and channel rail construction is issued by Duo-Safety Ladder Corp., 809 Ninth Street, Oshkosh, Wis.

All aluminum construction offers the advantages of light weight plus greater strength and safety. Featured are heavy duty and light and medium industrial types in both single and extension models . . . folding ladders, marine boarding, scaffolding, light telephone and utilities plus a heavy aluminum platform step ladder. Copy on request.

Gas Analysis Apparatus. Catalog 80 of Burrell Technical Supply Company 1936 Fifth Ave., Pittsburgh 19, Pa., gives complete illustrated descriptions of gas analysis apparatus including laboratory and portable models, flue gas analyzers, gas purity testers, H2S and Sp.G apparatus, together with listing of accessories and reagents.

Included in this 100 page catalog is the Burrell Manual for Gas Analysts comprising some 35 pages.

Fluid Handling. J. A. Zurn Mfg. Co., Erie, Pa., has recently published a Fluid Handling Equipment Catalog No. 45 which describes a complete line of tested devices for the protection of operating equipment connected with the piping systems utilized in industrial, processing and power plants.

It features a complete line of suction and pressure line fittings such as Duplex Vertical & Horizontal Chamber Type Strainers, "Y" Strainers, Angle Type Strainers, 90° offset pressure and 180° straight-through pressure strainers, and remote valve control assemblies.

"Barometric Condensers" is the title of bulletin 9012 announced by Ingersoll-Rand Company, 11 Broadway, New York, 4. It covers both the disc-flow and ejector-jet types, explaining the uses, advantages and operation of each. Several schematic diagrams illustrate how these vacuum-producing systems work and a number of photographs show the condensers in various industries.

These condensers are suitable for any vacuum service where it is not necessary to reclaim the condensate. They are used with steam engines, steam turbines, vacuum pans and evaporators. They are also applicable to high-vacuum processes, such as vacuum cooling, distillation, impregnation, hydration, and dehydration and as air or gas washers.

Ratio Control: The Askania Regulator Company, 16th & Michigan Ave., Chicago 16, has published bulletin #101 on Ratio Control. It points out the manner in which Askania Ratio Control may be applied to many types of proportioning applications in the process industries.

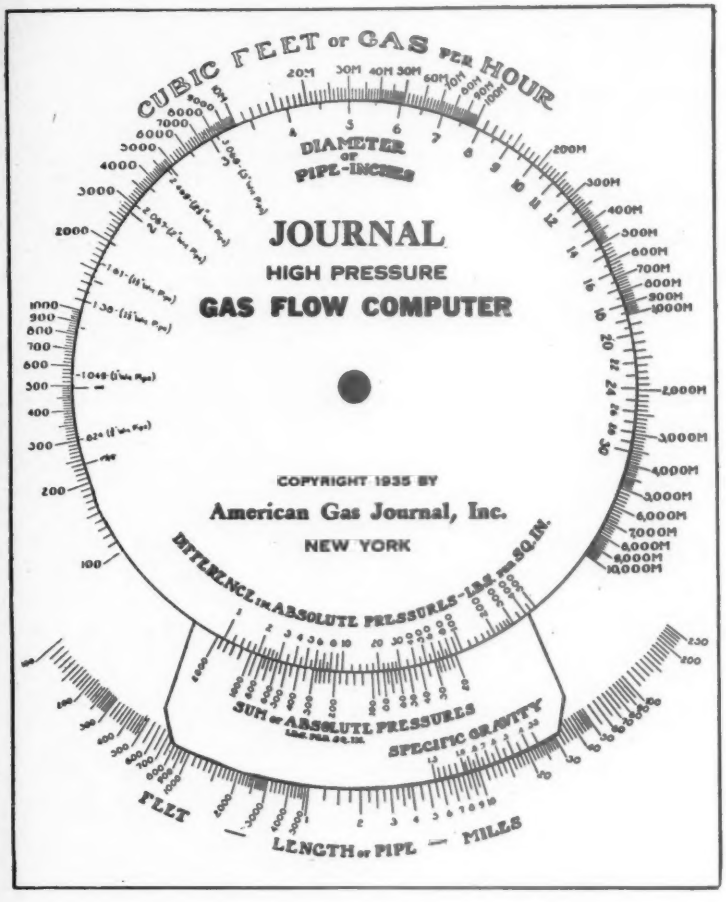
A novel feature of the bulletin is the orifice calculation chart. This offers engineers a quick and easy method of orifice size determination for air and gas flows.

Melting Furnaces: A condensed catalog, No. 550, illustrating and describing the complete Fisher line of non-ferrous melting furnaces is available. Recommended applications, capacities and dimensions are given. This catalog also presents Fishers' Centrifugal Blowers, Combination Blower and Oil Pump Units, Oil Burners, Silicon Carbide Linings, Karmix Furnace Cement, etc. Issued by Fisher Furnace Company, 5535 North Wolcott Avenue, Chicago 40, Illinois. Bulletin 600 describes and illustrates furnace accessories.

Insulation: U. S. Department of Commerce bulletin CS 117-44 covers mineral wool applications in blanket, block and pipe-covering form for high temperature uses up to 1300° F. It is a recorded voluntary standard of the trade prepared at the instance of the Industrial Mineral Wool Institute to establish minimum specifications for the guidance of all concerned in its use. Its 30 pages include several illustrations of application and details of requirements.

Plant Maintenance. Bulletins issued by Guaranteed Products, 1117 Crenshaw Blvd., Los Angeles, Cal., describe "Creto" for waterproofing masonry, "Mastic Mix" for surfacing and resurfacing floors and a synthetic plastic mastic for coating roofs.

"Journal" Gas Flow Computers



These Improved Gas Flow Computers are available in durable celluloid, encased in a convenient leatherette cover with complete instructions.

Actual Size 6¼ x 7½

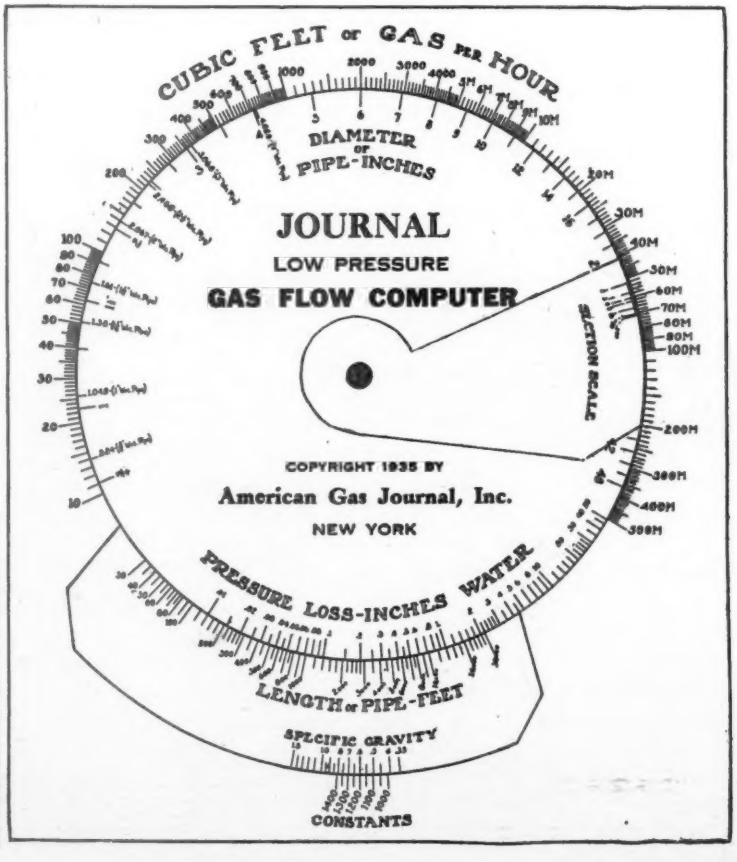
High Pressure Computer Range:

Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in. 1-500
Sum of Absolute Pressures—Lbs. per sq. in. 2000-20
Specific Gravity 1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure Computer Range:

Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter ¾" to 48" (including standard and actual weight up to 4")
Pressure Loss Inches .01-10.
Length of Pipe—Feet 30-30,000
Specific Gravity 1.5-.35
Constants 1400-1000

Price $3.50 Each, Postage Prepaid



AMERICAN GAS JOURNAL
53 Park Place, New York 7, N. Y.

Please enter our order for Computers as follows at $3.50 each, postage prepaid

....HIGH Pressure Computer

....LOW Pressure Computer

NAME .....

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Following slightly used machines:

1—3½" x 10" Connersville Rotary Displacement Gas Meter with 3" inlet and outlet—Capacity 5000 cu. ft. per hour.

1—No. 65 Connersville Type XAS Gas Pump, capacity 5400 cu. ft. per hour at 690 R.P.M. against 6lb. pressure with 5 H.P. electric motor.

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135 Jefferson Avenue, Scranton, Pa.

GAS ENGINEER WANTED

A well established consulting organization in New York has opening for Gas Engineer qualified to undertake economic studies, planning and design of manufactured gas plants and systems. Applicants please submit experience record, education, age and salary required. Address Box 141 c/o AMERICAN GAS JOURNAL, 53 Park Place, New York 7, N. Y.

Girdler Corporation Makes New Appointments

L. E. Osmer has been appointed sales manager of The Girdler Corporation's Gas Processes Division, it is announced by W. R. Wood, vice president.

Mr. Osmer began his business career with the Semet Solvay Engineering Corporation, as a cadet engineer, in 1923. For four years he was a construction superintendent for the firm, and in 1928 was promoted to the sales engineering staff. From 1930 until 1943, when he joined the Gas Processes Division of The Girdler Corporation, he was Semet Solvay's District Representative for the Midwest, with headquarters in Chicago.

Mr. Wood has also announced the appointment of J. D. Gordon as Eastern Representative, with offices at 150 Broadway, New York. He assumed his new duties on April 1.

Mr. Gordon received his B. S. degree in chemical engineering from Georgia Tech in 1936, and joined the staff of the Swann Chemical Company, Birmingham, Ala., the same year. He became associated with The Girdler Corporation's Gas Processes Division in 1939.

Main offices of Girdler Corporation are at Louisville, Ky.

CONVENTION CALENDAR

May

7-11 *National Fire Protection Association,* Annual Meeting, Palmer House, Chicago, Ill.

16 *Pennsylvania Gas Association,* Philadelphia, Pa. Attendance limited to 49-invitation only.

June

19-22 *Canadian Gas Association* Victory Convention, Murray Bay, Quebec. Boat party leaves Montreal, June 18.

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

"Synthetic" Natural Gas from Coal

By Frank Cipolon

Foreseeing a shortage of natural gas in the not too distant future, chemical engineering research men at the University of Michigan are investigating a method for large scale production of synthetic natural gas out of coal.

Research on natural gas is conducted under a fellowship for graduate work in the field of gas engineering which is offered by the Michigan Gas Association. It is the oldest industrial fellowship in the Country.

Dr. Alfred H. White, emeritus-professor of chemical engineering has been in charge of the fellowship for the 44 years it has been given.

The new process, which may make possible extensive commercial production of artificial gas, makes the synthetic methane directly from coal using high pressure. The coal is finely crushed and showered down into a hot furnace through one-way feeder valves. Hot air and steam are blasted in at the bottom producing blue water gas which is piped off at the top by the time the finely crushed coal hits the bottom of the furnace.

The coke made when the coal was burned is used for heat in the bottom part of the furnace. In the second step of the gas-making process, the blue water gas is changed into methane by using high pressure and a catalyst of nickel or metallic oxide, and as a final by-product there may be a heavy oil which might be utilized in the chemical industry. Previously artificial gas was made either by distilling coal in retorts which called for expensive equipment, or from blue water gas produced when coal was only partially converted to a useful gas in a steam furnace. Both of these methods produced a costly and inferior product.

Recently the University Board of Regents received a $6,000 gift from the Michigan Gas Association to purchase equipment to continue experimentation and to investigate the method of making synthetic methane.

Helium in Texas

(Continued from page 49)

occur, the two Bureau lines were equipped with a series of special valves designed by a Bureau of Mines employee which close the pipelines automatically on each side of the break in case of a sudden upsurge in flow from the predetermined rate of the line. The valves prevent a loss of the entire volume of helium in the lines, limiting the leakage to the section between check valves.

Special precautions were taken to guard the Exell-Amarillo line against floods of the Canadian River, which have broken many pipelines which lacked sufficient weight to keep them below the moving sand and water. Instead of the conventional single crossing, the helium line was divided and two separate transmission lines were placed across the river, one looped about 150 feet upstream from the actual crossing to allow settling as sand and gravel are washed from under the line. As a further safeguard, each of the lines was surrounded by a 4-inch pipe line and the space between the pipes filled with cement to add more weight.

Full operation of the underground storage system will assure increased conservation of the Nation's supply of helium, produced only by the Bureau of Mines. Valuable in wartime for a wide variety of military uses, helium also is used widely in scientific and industrial operations which are expected to be expanded greatly.

Helium shipments to commercial distributors which maintain stocks in the principal cities of the country more than doubled in 1944 compared with 1943.

Prize Contest on Gas Water Heating

An essay contest for Home Service Departments of the gas industry on the subject "What Can Home Service Do To Aggressively Promote Adequate Gas Water Heating Service?" has been announced by the American Gas Association.

This contest is spnosored by the Water Heating Committee of the Residential Gas Section for the purpose of enlisting the aid of Home Service in promting water heater sales and to provide a source of new publicity material on the subject. What is wanted is specific ideas—be it lecture, demonstration or home call technique. Illustrative material can be used;—such as pictures, cartons, distributive pieces, etc.

The Contest rules are:

1. Contest is open to all Home Service Supervisory Directors and Home Service Representatives of Gas Utilities in the United States and Canada.
2. There is no limit on the number of words to be submitted.
3. Entries must be postmarked no later than midnight of Thursday, May 31, 1945.
4. All material submitted becomes the property of the Water Heating Committee of the Residential Gas Section and may be altered and used in any way in which the Committee decides.
5. Decisions of the Judges will be final.
6. All entries must be typewritten on one side of the paper, preferably double spaced.
7. The contestant's name, address, company, and the name of her supervisory director, if any, is to be submitted on a *separate sheet* accompanying the entry. The contestant's name *should not* appear on the entry.

The awards for best papers are:

First Prize ..	$150.00 in War Bonds
Second Prize	75.00 in War Bonds
Third Prize ..	50.00 in War Bonds
Fourth Prize .	25.00 in War Bonds
Fifth Prize ..	25.00 in War Bonds

And in addition: Where a member of a department with a Supervisory Director wins a prize, the Supervisory Director will receive a special award of a $25.00 War Bond.

Gas Meters Assn. of Florida Elects New Officers

W. Harold Duguid, assistant general manager and sales manager of the Jacksonville Gas Corporation, has been elected president of the Gas Meters Association of Florida and Georgia.

The association is comprised of all gas companies in the two states and is affiliated with the American Gas Association.

Elected vice-president was W. Bond Collins of the People's Water and Gas Company, Miami Beach, Fla., while Buill G. Duncan of the Florida Power Corporation, Orlando, Fla., was named secretary and treasurer.

Mr. Duguid started with the Jacksonville Gas Corporation 18 years ago as a pipe fitter and was later promoted to street distribution department, the commercial office department and later to sales manager. In December, 1942, he became assistant general manager.

In addition to his new duties, Mr. Duguid is president of the Jacksonville Advertising Club, vice-president of the Jacksonville chapter, The Society for the Advancement of Management and is past president of the Executives Association of Jacksonville.

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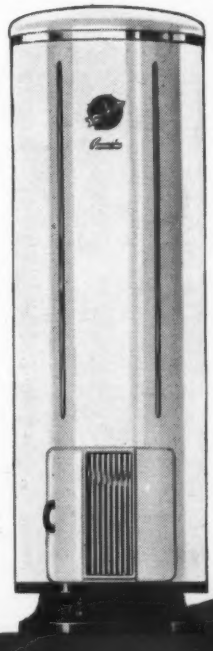

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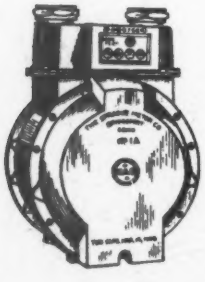
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